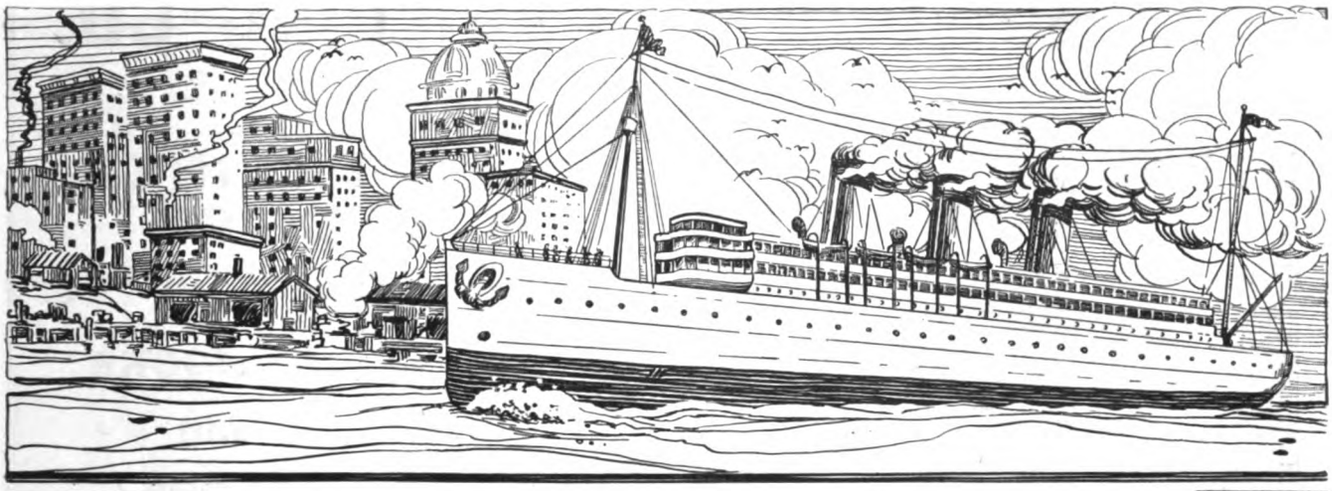


CLEVELAND—NEW YORK, APRIL, 1916

THE MARINE REVIEW

A Monthly Publication Devoted to Ship Building, Marine Engineering and the Business of Transportation by Water.

Published by The Penton Publishing Co., Cleveland, Ohio, U. S. A.

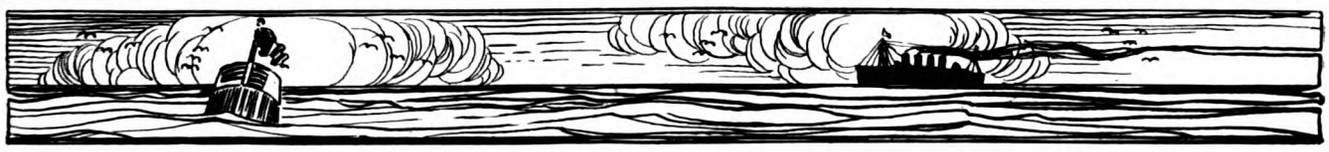
IN THIS ISSUE

BRANCH OFFICES

CHICAGO	1521-23 Lytton Bldg.	PITTSBURGH	2148-49 Oliver Bldg.
CINCINNATI	312 Johnston Bldg.	WASHINGTON, D. C.	206 Corcoran Bldg.
NEW YORK	508 West Street Bldg.	BIRMINGHAM, ENG.	Prince's Chambers

Subscription $2.00 per year postpaid, all over the world. Single copies 20 cents. Back numbers over three months, 50 cents. The Cleveland News Co. will supply the trade with *The Marine Review* through the regular channels of the American News Co. European Agents, The International News Co., Breams building, Chancery Lane, London, E. C., England.

Entered at the Post Office at Cleveland, Ohio, as Second Class Matter.



THE MARINE REVIEW

VOL. 46 CLEVELAND APRIL, 1916 NEW YORK No. 4

For the Glory of the Twin Tin Gods

Congressional Worshippers of Patronage and Politics Propose to Re-establish American Maritime Supremacy With a Fleet of Sixty Ships

ONCE MORE the administration ship purchase bill may capsize before it leaves the launching ways. Frantic efforts are being made to save it. Expert congressional shipwrights from such great maritime commonwealths as Minnesota, Kentucky, Arkansas and Texas, constituting the committee on merchant marine and fisheries, are busy shoring up the trembling cradle with strong pillars of hot air. Yet this new fledgling of the deep totters on her skids.

Redfield, McAdoo and Bill Wilson, hardy mariners from the cabinet, skilled in fashioning strong words and molding subtle phrases with which to brave the storms of public criticism, have responded to the sound of the tocsin—alas, to no avail! Their weighty, double-riveted paragraphs, rushed through the presses without even a proofreading, have somehow failed to stay the careening structure.

Innocent bystanders have intimated that the foundations of the building slip are grounded in quivering quicksand—but what does a congressional shipwright from Kentucky or Texas care about sound foundations, when his eyes are glued to the towering, brass-bound bulwarks of patronage?

The Foreman Isn't So Sure

However, one Joshua W. Alexander, foreman of the construction gang, bronzed by long exposure on the wind-whipt waters of the mighty Missouri, seems to have certain qualms. He has even listened, now and then, for a minute or two, to the advice of mere outsiders who get their living from the sea. We suspect he would like to jettison a portion of the cargo of spoils, prematurely placed in the half finished hull, but is afraid his gang will strike if he should venture a practical suggestion.

What do the worshippers of the twin tin gods, Patronage and Politics, care for practical work-a-day affairs?

> They live not for work that's drab;
> They simply stand and gab—and grab.

Seeing the nation in distress, her commerce throttled, her defenses menaced for lack of merchant ships, these disciples of the twin tin gods propose to make a medicine. They will vote fifty million dollars out of the public treasury to buy some sixty ships—if they can get them—and turn them loose under the management of those two hardened sea merchants, Daniels and Redfield, to revolutionize the water-borne commerce of the world!

Pork Makes Slippery Fingers

This is to be the American merchant marine—the proud fleet that is to carry our flag from the Yangtze-kiang to the Rhine and from Baffin's Land to Cape Town. Sixty ships! We need a thousand. England lost six times sixty in the first year of the war and never knew they were gone.

But it is hard for fingers greasy with pork to grasp a fact.

Now comes Hon. William C. Redfield, who learned some facts regarding vessel construction, metacentric height, etc., at a little investigation in Chicago last July, with the wholly novel proposal that we build steamers out of structural steel in duplicate, like skyscrapers—only the latter are built one at a time to special design, we believe.

An Idea as New as the Hills

We gracefully acknowledge that the idea of building seagoing ships in dozen lots with interchangeable parts is an American conception. We even remember, dimly, some discussion of this novel idea, recently advanced by the secretary of commerce, as far back as the Spanish war. Our friends on the Clyde remember it, too, and they have occasionally built ships over there in duplicate, in quadruplicate, etc.

In the United States, except on the Lakes, the idea was allowed to wither because it meant simply the multiplication of those losses inherent in operating a vessel under the American flag according to the dictates of a sea-wise congress.

Ship Purchase Bill is on the Ways

House Committee on Merchant Marine and Fisheries Holds Hearings for a Month — Strong Opposition Developing

HOPE is expressed by democratic members of the house committee on merchant marine and fisheries that the committee will be able to make a favorable report on the administration ship purchase bill the latter part of March. Hearings on the measure consumed one month, having been begun on Feb. 10 and concluded on March 10. While supporters of the measure profess to think it can be passed in the house, it is apparent it will be strongly opposed and may be defeated. It appears that the determining factor is the position that will be taken by certain democrats whose attitude on the measure has not been clearly defined. Among the substantial forces against the administration is its own house leader, Claude Kitchen. To what extreme he may press his opposition is a question, but it is believed he will not make a concerted effort to defeat it but may content himself with a set speech expressing opposition to the measure. The so-called Tammany element in congress may, through turning solidly against the measure, cause its defeat, assuming the republicans will be united in their opposition to it. A defection of 13 votes would defeat the measure, if the forces line up as indicated, and the complete strength of the house votes. It is believed the administration can muster a good majority in the senate if the bill reaches that body.

Chairman Alexander of the committee, during the hearings took a position which has been interpreted as showing rather liberal views in some respects, and appeared ready to give substantial weight to the testimony of numerous witnesses who testified in opposition to the measure, and changes may be made in it as a result. There is no hope, however, that it will be deprived of its most objectionable features, as seen by its opponent. These include the idea of state socialism because the government may operate, lease or charter the vessels it is proposed to obtain with the $50,000,000 provided in the bill; government competition with private shippers; and too strict regulation of rates by the proposed shipping board. It was also pointed out that not only would the $50,000,000 be utterly insufficient to build up anything like an ample merchant marine, but that owing to the congested condition of ship yards and tremendous demand for vessels these could not be obtained earlier than 1918.

Of all the testimony adduced in opposition to the bill, perhaps the most important was that of William H. Douglas, of New York, chairman of the merchant marine committee of the chamber of commerce of the United States. Mr. Douglas was the first witness to appear before the committee, and stress laid on his testimony was due to the fact that he acted as the spokesman for the national chamber of commerce, whose referendum on the question of merchant marine recorded an overwhelming sentiment against the government going into the shipping business. At the same time the referendum showed the national chamber to strongly favor recommendations made by its merchant marine committee, which suggested subsidies to private shippers as the only practicable means of building up an adequate American merchant marine. Mr. Douglas brought these facts out plainly before the committee.

Douglas Speaks in Opposition

Mr. Douglas said that in his opinion congress should make it plain, if it enacts the shipping bill, that no discrimination should be made against Americans by compelling them to procure licenses and not requiring the same of foreign lines. Judge J. W. Alexander, chairman of the committee, said that the bill does provide that foreign vessels must obtain licenses the same as American vessels, but said if there is any doubt as to the meaning of the bill in this direction the committee would be perfectly willing to amend it accordingly.

Mr. Douglas said that he did not think the $50,000,000 provided in the bill would secure more than 60 vessels of the right type. He said that 10 years ago between $4,000,000 and $5,000,000 given as government aid would have established at least eight steamship lines to foreign countries, and with $50,000,000 spent in that way in that time it would have provided at least 200 or 300 steamers. Mr. Douglas also thought the bill should carry a provision limiting government operation of the vessels to a reasonable number of years after the war, and "take the string out of your bill, because what is the use of having government operation with $50,000,000?"

"It is a farce on the face of it," added Mr. Douglas, "because what are you going to do when you get your 60 steamers with your $50,000,000? Are you going to go to congress next year and say, 'We made a mistake; the United States does not want 100 vessels; it wants 1,000 vessels,' and ask congress for $100,000,000? You will not get it." Mr. Douglas objected to some of the provisions of the present navigation laws, and mentioned them, along with other matters, such as wages paid to American seamen, as being principal factors in making the cost of operation of vessels under the American flag higher than that of vessels under a foreign flag. The question of the navigation laws was discussed by Eugene Tyler Chamberlain, commissioner of navigation, department of commerce. In substance, Mr. Chamberlain said that the American navigation laws are not antiquated as is repeatedly charged, but that they are constantly being revised in every practical way to aid American shipping. Secretary of Commerce William C. Redfield said that he had talked with and written to prominent American steamship interests in an effort to get them to suggest desirable changes in the navigation laws, but that thus far he has been unable to get a definite suggestion as to what is wanted.

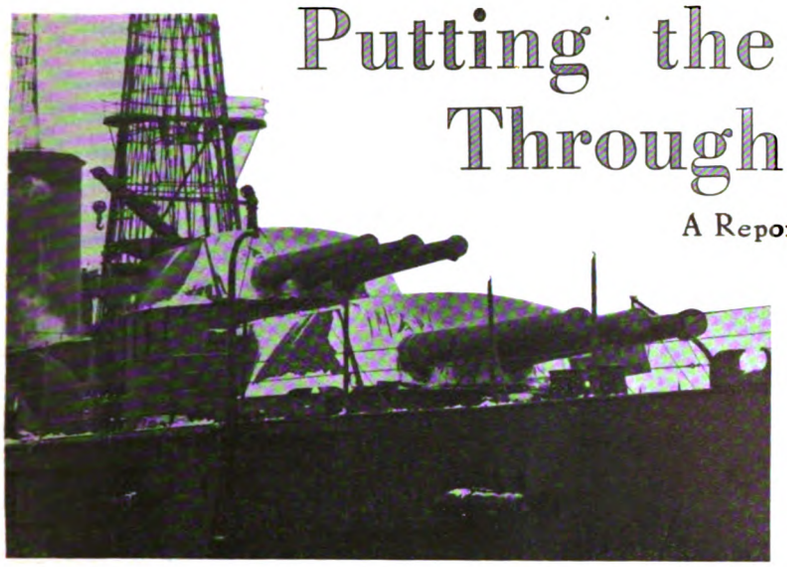
Mr. Redfield said the reason why the secretary of the navy and the secretary of commerce were put upon the proposed shipping board provided in the bill is because they represent the two great maritime departments of the government. Mr. Redfield was not disposed to think the matter of cost of building vessels in the American shipyards and operating them under the American flag was any obstacle. For instance, he said that ship plates are absolutely cheaper in the United States in ordinary times and structural steel of that character is made more cheaply in this country than any other.

Replying to statements that the $50,000,000 would not be sufficient to go a great way, Mr. Redfield said this money may be used in large part over and over again, and added:

"We should be very glad to see the bill, if it is not perfectly clear in that respect, made so in this way: That if a ship is sold the funds received from the sale of that ship may be utilized for the further pursuance of the objects of the bill." Mr. Redfield introduced in evidence letters received from E. Platt Stratton, supervisor of the American Bureau of Shipping, New York, sug-

(*Concluded on page* 130)

Putting the Pennsylvania Through Her Paces



PENNSYLVANIA'S FORWARD BATTERY OF 14-INCH GUNS

A Report of the Standardization Trials of Uncle Sam's Newest Superdreadnaught on Feb. 24—Big Ship Makes Good for Her Builders.

Navy Trial Board Officials

Capt. Henry B. Wilson, President
Capt. Emil Theiss
Commander G. E. Gelm
Navy Constructor W. P. Robert

ROCKLAND lay deep under a mantle of snow when the navy trial board arrived on the five o'clock train from Boston, the afternoon of Feb. 24. The battleship PENNSYLVANIA, Uncle Sam's latest and biggest super-dreadnaught, lay off the famous breakwater, which makes this northern Maine port one of the finest harbors on the coast.

PENNSYLVANIA had arrived two days before, after a record-breaking run up the coast from the yards of her builders at Newport News, Va., making an average speed of close to 20 knots an hour in the teeth of a half gale from the northeast, which set in off Cape Cod. President Ferguson, of the Newport News Ship Building Co., and a picked crew of 500 men from the yard, were in charge, their business being to demonstrate to the navy department that the ship, which cost the government fifteen million dollars, came up to specifications in every particular.

The word was passed to the drivers of the coach sleighs that met the train, to proceed at once to the dock down on the bay shore, where the tug PORTLAND was ready to put the officials and attaches on board. The tug captain who had just brought some of the crew ashore, however, thought different. It was still blowing northeast and there was too much sea running outside the breakwater to risk crushing his cockleshell of a tug against the armored sides of the battleship. Not much—he would take them aboard at six o'clock in the morning. Perhaps the proprietor of the Thorndyke hotel slipped the old man a few tons of coal; in any event, he had a full house that night for food and lodging, while the crew, also marooned ashore, made the most of Rockland's special brand of hospitality.

You could cut the cold with a chisel the next morning, when all hands headed down the half-lit street to the dock. Captains, rear admirals, deck hands and mechanics crawled over the ice-covered ladder and sought some sheltered spot, where the biting wind didn't hit. It was a quick, cold trip to the big ship, which loomed up through the frozen morning mist like a floating fort with her great 14-inch guns protruding from the fore and aft deck turrets, her secondary battery of 5-inch guns bristling from the side ports, while over all towered the two mighty cage masts with fighting tops a hundred feet above the waterline. Painted a blackish gray with decks stripped of boats except an old service launch and a couple of yawls, she looked like everybody felt—cold, grouchy and ready to fight.

There was no ceremonial of entree. The suit cases of the officers were hoisted aboard and hustled below with their owners to the mess room, where a small army of colored cooks and waiters were scurrying about with great platters of griddle cakes, ham and eggs, pitchers of coffee and other satisfying edibles, such as half a thousand hard-worked, hungry men could get outside of on a zero morning. The newcom-

MAKING 21 KNOTS ON THE ROCKLAND COURSE IN ZERO WEATHER

THE NEW U. S. SUPERDREADNAUGHT PENNSYLVANIA ON TRIAL OFF ROCKLAND, ME., FEB. 24, 1916. SHE IS A 21-KNOT, OIL-BURNING TURBINE BATTLESHIP OF THE FIRST CLASS

Copyright by International Film Service.

ers joined the host and by the time the meal was finished the sun was shining and the ship underway.

The serious business which called this immense battleship and all these important people in the dead of winter to this far away, ice-bound, God-forsaken port on the Maine coast was merely to run back and forth over a nautical mile course, 6,080 feet in length, staked out by means of tall spars on the beach and huge targets back on the hilltops. Why go to Rockland merely to run over a mile course? Some more government red tape and expense, you might say. Here's the explanation. Rockland has the greatest depth of water close to shore of any fairway on the Atlantic coast. Between the barrel buoys, anchored about three quarters of a mile off the ranges, there is an average depth at low tide of 70 fathoms, 420 feet. That's why the deep-draught dreadnaughts go to Rockland; they can practically run at top speed without dragging.

The fact is well known that screw-propelled ships need 16 times their draught in depth of water, to get away from bottom influence. PENNSYLVANIA, with a mean draught of 28 feet 10 inches, really needs 460 feet, but she does nicely in 420. She must make 21 knots and as much more as possible. A small fortune is at stake if she goes over or under her guaranteed speed.

About the time all hands were ready for the day's work, one of the trial board found his suit case missing. It contained important instruments and must be found. The last seen of it one of the negroes with proper instinct was toting it away from the gangway. Not giving the colored son credit for "knowing the game," every place was searched, but the pilot house, where, at the end of an hour's hunt, it was found—and the trials began.

Four runs over the mile, two up and two down, were made at varying speeds for purposes of standardization. The oil used for fuel and the oil used for lubricating purposes was carefully weighed before the trials began, and the consumption carefully noted on each trial. Every condition pertaining to the operation of the power plant was noted. The revolutions of the shafts, the steam pressures and temperatures were all recorded systematically. Outside, wind, water and tidal currents were observed, so that the operation of the ship under actual service conditions at speeds of eight, 10, 12, 15, 17, 19 and 21 knots could be estimated accurately and standardized for future reference.

The youngster who was forced to stay after school and write the word he had misspelled 50 times on the blackboard had nothing on the men who worked all that long, cold day aboard PENNSYLVANIA. The monotony of it can scarcely be described. There was no conversation, no play — all work with numbed fingers and feet — while the remorseless three bells to get ready as the line was approached, followed by one bell, as the observer on the bridge caught the line of sight of the ranges, kept everyone at his post.

It was a holiday only for the sea gulls. They probably never saw so much food thrown away in their lives. The flock resident in Rockland got next to the situation early and squawked their pleasure over the early breakfast spoils. By some means the easy gorge must have been telegraphed far and wide, for the numbers of birds doubled and trebled and doubled again, until at noontime it seemed as though every gull on the Maine coast, from Bar Harbor to Portland, was on the job. If the United States could build as many armed aeroplanes as there were sea gulls that day off Rockland, and they could fly as well, no enemy's fleet would be able to come within gun shot of our coast. And if Uncle Sam's aeronautic service were as well provided for as were those gulls, it might be as rapidly augmented. Perhaps the most inter-

esting feature of PENNSYLVANIA is her power plant. There are in all 10 turbines located in four engine rooms, four for cruising speed up to 15 knots, four main center turbines for high speed above 15 knots, and two for reversing. The cruising turbines operate through huge Westinghouse reduction gears on a ratio of 15 to 1, the engines turning up to 3,000 revolutions per minute on a shaft speed of 200. They drive the wing shafts on either side and the main engines are not in use while the cruising plant is in operation. Enough exhaust steam, however, is delivered to the main turbines to turn them over and take the drag off the propellers. The maximum efficiency obtained through the gear drive is said to be 78 per cent.

When a speed of over 15 knots is demanded, the cruising turbines are stopped and the boat is driven entirely by the two main propellers, which are direct connected to the main high and low pressure turbine. Therefore, although there are four propellers, only two are used at any one time. When the big machines are driving the boat at high speeds, the engine room is very quiet and the absence of vibration throughout the ship is extremely noticeable. In fact, it is necessary to see the water passing the side to know the ship is moving when on a straightaway course in smooth water.

Some idea of the magnitude of PENNSYLVANIA and the colossal proportions of her operating equipment may be obtained from the size of the rudder, which weighs 76 tons and has an effective bearing surface of 365 square feet. The steel rudder post is 26½ inches in diameter, while the yoke weighs 23 tons. Both steam and electric steering gears are used, each being installed independently of the other, so that if one system breaks down, the other is immediately available. The anchors are handled entirely by electricity by means of two big General Electric motors in the windlass room, which is located on the lowest deck forward, just above the hold space. Three anchors, a starboard bower, port bower and port sheet anchor are in readiness for use at all times.

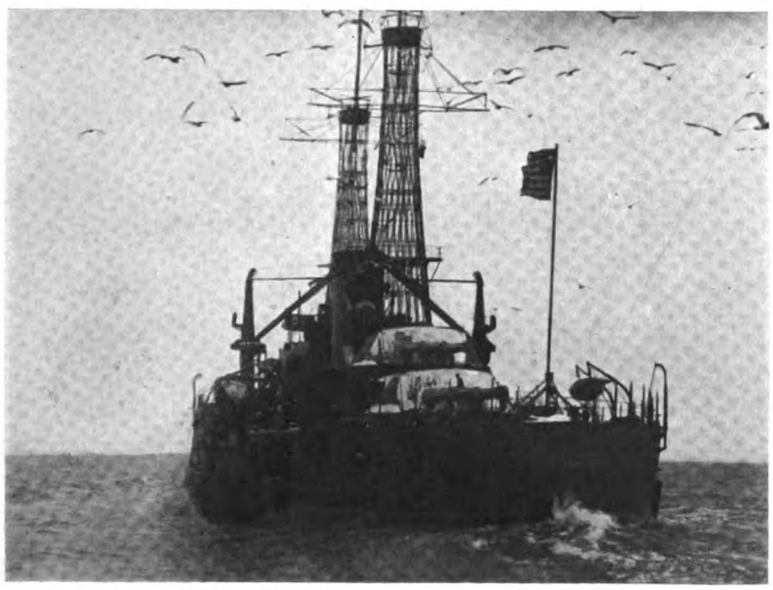
Some Facts About Pennsylvania

Length over all, 608 *feet.*
Beam, 97 *feet.*
Draught, 28 *feet* 10 *inches.*
Horsepower, 31,500.
Displacement, 32,567 *tons.*
Speed guaranteed, 21 *knots.*
Cost, about $15,000,000.
Builders, Newport News Ship Building Co.
Type of engines, Curtis turbines.
Boilers, 12 *B. & W.*
Heating surface, 58,150 *square feet.*
Weight of machinery, 2,399 *tons.*
Armament—
12 14-*inch* 45 *cal. B. L. R.*
22 5-*inch* 51 *cal. R. F.*
4 21-*inch submarine torpedo tubes.*
Construction began Feb. 28, 1913.
Contract date of completion, Feb. 28, 1916.

The morning trials at eight, 10 and 12 knots were long drawn out, due to the slow speed. A brisk northerly breeze swept down from the snow-covered Maine hills and made quite a bobble for the small fleet of tugs and scallop boats, which were scattered along the course. Now and then a fishing schooner bound to the fishing grounds would beat her way out of the harbor until she rounded Owls Head, then with sheets started, would leg it out to sea. On the tugs were the movie men and staff photographers, making films for millions to see in every part of the world. They will leave an indelible record of the remarkable achievement of the naval architects who designed the hull of this latest and greatest battleship, which at 12 knots moves through the water with scarcely a ripple. It is no exaggeration to say that a person in a small boat, a hundred feet away, could shut his eyes and never know this 32,000-ton ship, moving at a speed which would outdistance any bulk freighter on the Great Lakes, had passed.

When PENNSYLVANIA gets up to 15 knots, the bow and quarter waves begin to be apparent and from then on they climb proportionately. It is easy to see, however, how economical the power consumption is at cruising speeds, because when once in motion, she seems to slide along without the slightest effort. It's her great length and fineness of model that count. Dusk came on with only the 19-knot trials partially completed. That night the weather moderated and by morning the air was full of fog and rain, which made it impossible to see the ranges. In order that no time might be wasted, PENNSYLVANIA put to sea and her windlasses were thoroughly tried out. They worked beautifully and the auxiliary equipment was passed without a murmur.

On Sunday, Feb. 27, the weather cleared sufficiently to complete the standardization trials, after which the big boat was headed for Newport News, where she arrived in good order, and it is stated now that the only thing necessary is to polish her up ready for service. It is expected she will be turned over to the navy for final acceptance the latter part of April.



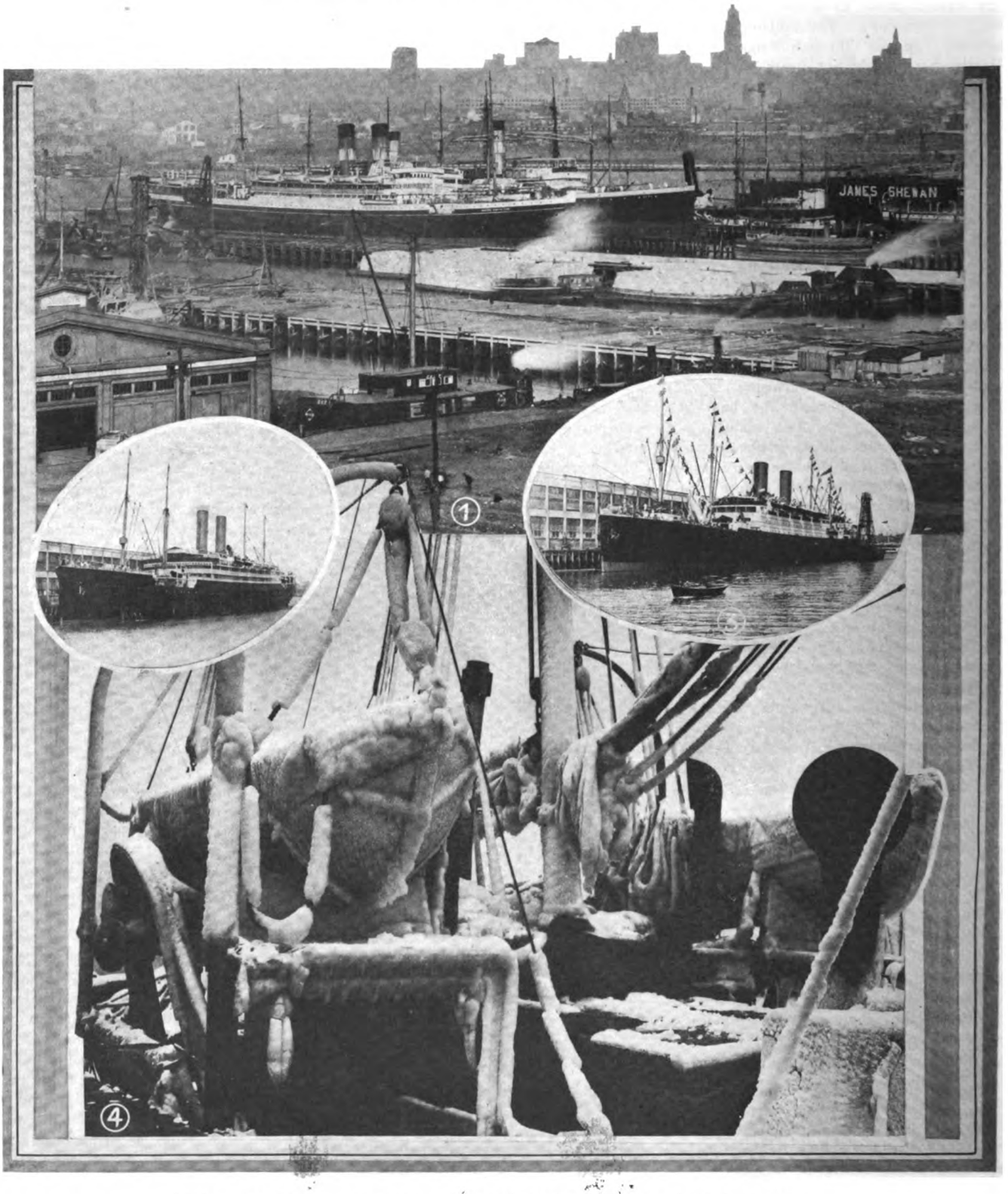
IT WAS A HOLIDAY ONLY FOR THE SEAGULLS
Copyright by International Film Service.

More Ships

The total number of vessels, with a displacement of 1,000 tons and upward, built in Japan with the government's subsidy since August, 1914, is 19, with an aggregate tonnage of 97,085, while 39 vessels with an aggregate tonnage of 138,559 are now under construction with the government's subsidies. A Japanese report states that out of a tonnage of about 490,000, in the transpacific service available after the withdrawal of the Pacific Mail, 430,000 tons were Japanese.

Photographs From Far and Near

Contributions For These Pages Are Solicited

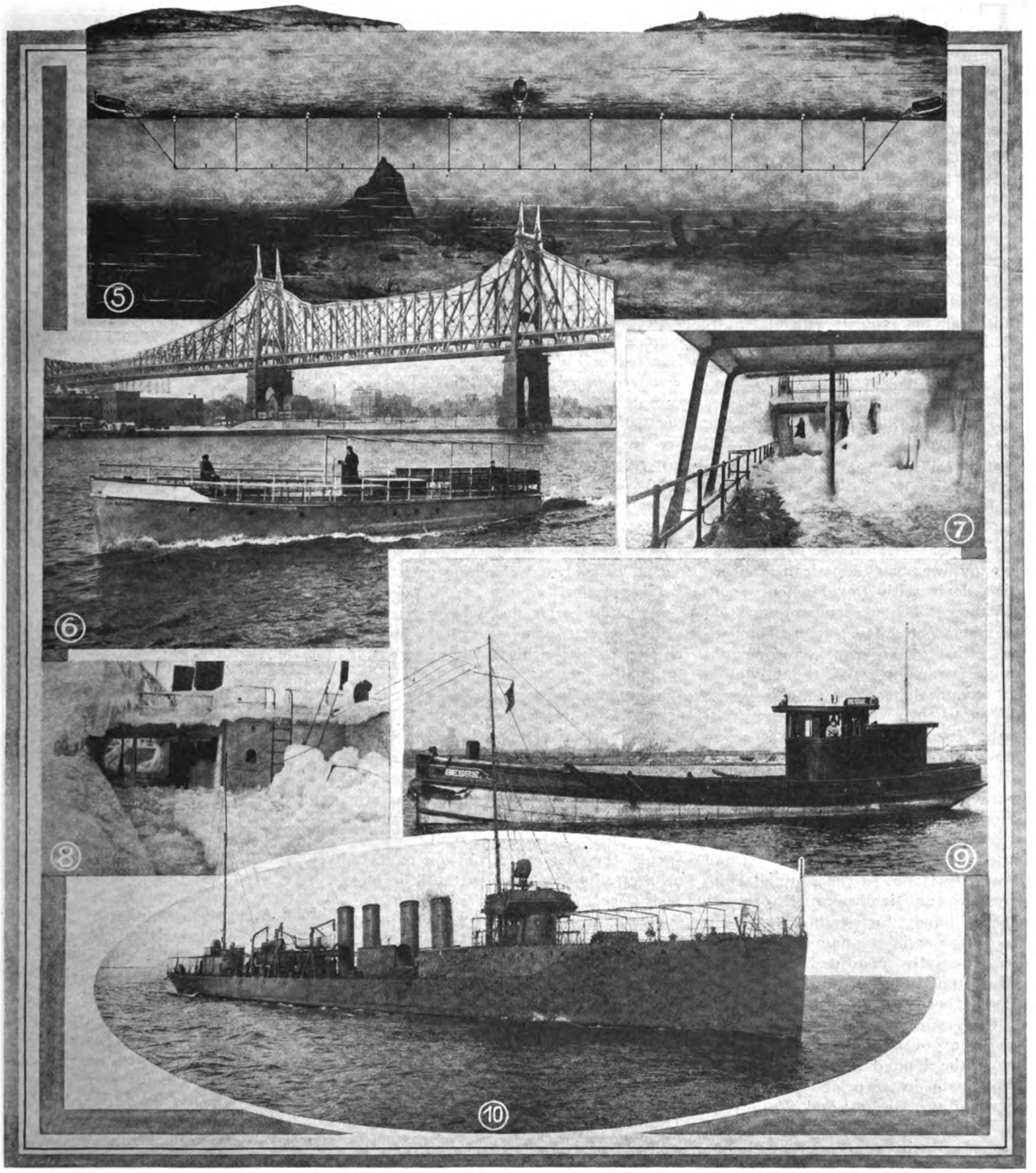


WHAT SEA POWER—OR THE LACK OF IT—MEANS TO A MARITIME NATION

In illustrations 1, 2 and 3 we have an impressive object lesson in adequate preparedness. Admittedly a marvel of efficiency and strength on land, Germany could not cope with Britain and the latter's allies on the seas. Therefore the spectacle of splendid merchant ships such as CINCINNATI and AMERIKA of the Hamburg-American line tied up in Boston and other neutral harbors, as shown in the smaller views. On the other hand, the ports of the United States, at peace with the dominant sea power, present such pictures of prosperity as illustrated in the Brooklyn waterfront scene above. The illustration at the bottom of the page, No. 4, depicts vividly the hardships undergone by the Grand Banks fishing fleet during the winter. The trawler BREAKER, has just returned to Boston port, weighed down by tons of ice on decks, gear and rigging. Heavy ice deposits have in several instances caused vessels to capsize.

Latest Marine News in Pictures

Payment Will Be Made For Acceptable Photographs



HOW SUBMARINE PERILS TO NAVIGATION ARE DISCOVERED IN ALASKAN WATERS

Reefs and pinnacle rocks are responsible for a long list of shipwrecks in the innumerable bays and channels of the Alaskan archipelago. Until recently the only ones definitely known to exist were generally named for vessels which had come to grief upon them. Illustration No. 5 shows how the federal coast and geodetic survey is charting these waters by means of a wire drag. No. 6 depicts a 64-foot steel passenger and cargo power boat recently completed by the Welin Marine Equipment Co., Long Island City, N. Y., for use in South American waters. Driven by a 65-75-horsepower Standard engine, she made more than 12 miles an hour on her trial trip. A car ferry owned by the Pere Marquette railroad, stranded in the ice off Ludington, Mich., is shown in Nos. 7 and 8. In No. 9 is seen BESSIE, a sturdy water-carrier of Baltimore harbor, powered with a 35-55-horsepower Sterling engine; while No. 10 depicts JACOB JONES, one of Uncle Sam's crack new destroyers, which was recently built by the New York Ship Building Co., Camden, N. J.

Vessel Agents at Panama

What the English Think of Some of Our Administrative Methods

THE refusal of Panama canal authorities to deal with independent agents has aroused considerable feeling in Great Britain, which *Fairplay* voices in the following article. The discussion is of interest in its revelation of the English viewpoint.

The book of sailing directions and general information issued by the Panama canal authorities is a revised edition, and contains a mass of useful information for owners and masters of vessels using the canal. In this volume the dead-set of the canal authorities against the employment of independent agents is dealt with at length. The Panama railroad is now dragged in as a suitable agency, if shipowners are so self-willed as to have agents at all. Now, it cannot be too clearly understood by owners and time-charterers, who are naturally much interested in dispatch, that the executive of the canal and the Panama railroad Co. are for all practical purposes identical. When the canal was projected what happened was this: The railroad company was an American concern which dealt with transhipments over the isthmus. The government saw that it would never do to tolerate competition with its own canal, and bought out the company, with the exception of a few recalcitrant shareholders who held on to their stock. The governor of the Panama canal was thereupon appointed president of the Panama Railroad Co., and the fiction of a separate entity was maintained for reasons which will soon become apparent. Under the constitution of the United States the government is not allowed to trade, so the railroad company, as an incorporated concern, come in handy for dealing with various commercial monopolies which were promptly instituted. Thus all coal supplies, stores, stevedoring, wharves, boating, etc., are the privilege of the railroad company, working under the governor of the canal.

Now the United States government is fortunate in securing as governor a man of the sterling and administrative qualities of Colonel Goethals, whose work in connection with the canal has won the admiration of the world; but, unfortunately, the American political system does not permit of the gallant colonel's talents being utilized to full advantage. The politician from "way back" has a friend who wants a job. His previous occupation may have been cattle-punching in Arizona or sticking porkers in Chicago, but by a judicious use of the "pull" he finds his way to the canal and, in his capacity as boss of the bottle and jug department, assists the seafaring experts of all nations in taking their vessels through the ditch or it may be to administer, say, the red-tape department, or any simple thing like that. But not content with filling his own niche with more or less success, he insists upon replacing the subordinate officials, who are just beginning to know something, by his own particular friends, who are, of course, new to the business. As this is constantly going on, it is not to be wondered at that from time to time complaints are received as to the conduct of affairs in the zone. Delays are incurred; payments of tolls have not been notified, or, if notified, have been overlooked; disputes arise, and if the captain of a ship has no one on the spot to consult or advise him, valuable time is lost.

But, instead of welcoming assistance from practical agents on the canal, every endeavor is made to induce the confiding shipowner to entrust his interests to the arbiter who is constitutionally almost bound to decide against him in any dispute that may arise. Last week we dealt with the irony of the situation where the canal authorities deprecate the use of agents at all, laying special emphasis on the saving of fees, and in the same breath put forward the railroad company—their noble selves—as really useful agents, thus demonstrating out of their own mouths that an agent is desirable. The *Canal Record* was silent on the question of fees, though we ventured to express the opinion that the business would not be done for nothing; but the book now under review states, with naive simplicity, that in the case of vessels only passing through the canal no fee will be exacted, *but a commission will be charged.* This is really refreshing, and reminds one of the old riddle, "When is a door not a door?" "When it's a jar"—and a nasty jar, too, for an owner who has to answer the conundrum, "When is a fee not a fee", by replying (in an unknown number of dollars), "When it's a commission".

Now this sort thing is all very well in the land of the free, when their own compatriots are solely concerned—we have our own little jobs in the old country—but where international affairs are involved the game ought to be played. If the United States government chooses to pass a special act of congress to the effect that "no agents need apply", that is a straightforward performance, however much it might be held to interfere with treaty rights; but when a great nation descends to the hole-and-corner business which we have just described, then it seems to us that it is up to the shipowners of the world to insist upon their own representation, and to see that they get it.

Ship Purchase Bill

(*Concluded from page* 124)

gesting that the most adequate way to build ships is through standardization of types and pointing out that building material could be produced in large quantities by steel companies of the country and shipped knocked down to shipbuilding plants anywhere for purposes of fabrication.

An Inland Sailor Speaks

Secretary of the Treasurer William G. McAdoo in his testimony suggested that the bill be passed as quickly as possible, and explained its features in detail. Benjamin J. Rosenthal, a member of the Association of Commerce of Chicago, said that association favored the bill and strongly praised that provision of the bill proposing regulation of the operation of common carriers by water and said it was necessary to prevent foreign ships discriminating against American ships through rebates. Former Governor J. N. Gillette of California, representing the Matson Navigation Co., said the bill ought to make it clear that the government will not operate vessels in the coastwise trade where there is already an adequate private service performed.

John A. Penton, publisher of *The Marine Review*, strongly urged that the most constructive plan of building up the American merchant marine is through subsidies. He pointed out also that now is the most inopportune time imaginable to pass a ship purchase bill. Shipyards are so congested, he said, that if awards were made for vessels at this time they could not be delivered before 1918. Moreover, he said the cost of material is extremely high.

Announcement was made recently of the appointment of J. H. Torney, assistant manager of the Southern Pacific company's Atlantic steamship lines, to the management of R. Martens & Co., Inc., New York.

In the Traffic Manager's Office

A Review of the Charter Market on Coasts and Lakes—Pointers for the Men Who Get the Business

Organize Two $5,000,000 Companies

THE comprehensive plans being formulated by American maritime interests for the development of this country's merchant marine, are maturing rapidly. The abnormal conditions now prevailing in ocean trade have offered these interests an opportunity for expansion that they have quickly grasped. Confirmation of this willingness to aid in advancing America's merchant marine came last month in the organization of two $5,000,000 corporations. The chartering of these companies also furnishes another clear refutation of the claim that a government-owned company is necessary to provide bottoms for carrying this country's trade.

The two new companies are the Grace Steamship Co., organized by the well-known firm of W. R. Grace & Co., and the Gaston, Williams & Wigmore Steamship Corporation, which will be closely affiliated with Gaston, Williams & Wigmore, Inc., New York.

The new Grace company will take over a number of the freight steamers now being operated by W. R. Grace & Co., in the South American trade, including the new SANTA BARBARA recently delivered from the Cramp ship yards at Philadelphia. The company is also expected to take over SANTA ROSA and SANTA PAULA, both of which are now in course of construction. Each of these three steamers has a total deadweight of 9,250 tons, and are of the best type of modern construction for vessels of their class. The Grace interests placed orders for two more steamers with the Cramp company last month.

Expand American Ship Facilities

The new company is strictly American owned, and its fleet will sail under the American flag. At a recent meeting of the incorporators the following directors were elected: Joseph P. Grace, L. H. Shearman, J. Louis Schaefer, Maurice Bouvier and D. S. Iglehart. Other steamship subsidiaries of W. R. Grace & Co. are the Atlantic & Pacific Steamship Co., which, until the Panama canal was closed, operated steamers in the coast to coast all-water trade route between New York and San Francisco, but recently suspended service pending the reopening of the canal, and the New York Pacific Steamship Co., which conducted the trade between the United States and South America.

So far as can be learned, the present plans of the Grace interests, in organizing the new steamship corporation, involve merely the use of a fleet of American steamers from Atlantic ports of the United States for charter service to both east and west coast South American ports. No regular route or schedule of service is to be maintained, however, the vessels to operate at the call and purpose of their charterers. It is believed that the ships will bring about an expansion of American trade to and from Atlantic ports of the United States and South America.

Grace & Co. Extend Operations

W. R. Grace & Co. have been greatly extending their steamship operations since the war in Europe brought about the present scarcity of ships and freight rates reached high levels. The fact that the company would embark on a new service from Pacific ports of the United States to the Orient was made known recently, following the withdrawal of the Pacific Mail from that trade on account of the seamen's law.

While the present company will undertake the expansion of the Grace steamship business out of Atlantic ports of the United States and South American ports, the Grace interests have also been expanding their shipping activities out of the Pacific coast ports of the United States to Central and South American west coast ports. The big steamer SANTA CRUZ was added recently to the large fleet of chartered vessels in the trade on the Pacific between Tacoma, Wash., and west coast ports of South America. The company also operates a number of its owned steamers in the same route of water trade.

South American Freight Congestion

The entire west coast of South America is anxiously seeking additional ship facilities with which to carry on trade operations. A vast amount of freight has accumulated at the various ports awaiting shipment to other countries. The closing of the Panama canal, together with the new conditions brought about by the European war, is reported to be the principal cause for the South American freight congestion. All the ships that touch at ports along the west coast of South America, from Punta Arenas to Panama, regularly, have been taking on all the freight they could handle, and the large volume of this freight which has been transshipped by the Panama railroad across the isthmus has caused that government to seek additional rolling stock.

Peruvian ports are said to be stacked high with sacks of sugar, while in Ecuador it is reported that there are 750,000 bales of cotton waiting to be moved, and the harvest of cocoa is so large that a great portion of it may have to be destroyed if sufficient ocean freight capacity is not soon made available.

The Grace interests have been alive to the highly profitable field of ocean freight operations offering on both the east and west coasts of South America since the war in Europe cut off those ports from their usual supply of European buyers and European steamship facilities, and American trade with South America as a whole has recently witnessed a notable period of expansion. It is believed in shipping circles that the reopening of the Panama canal will find the Grace corporation in a most favorable position for extensive operations, via that waterway, between Atlantic and Pacific ports of the United States, as well as the east

and west coasts of South America and United States ports.

As the first step in the organization of its fleet, the Grace Steamship Co. purchased three vessels of about 5,700 tons each. The ships are VENEZUELA, ECUADOR and COLOMBIA, all flying the Dutch flag at present, and the price paid to Hannewig & Johnson, who put through the transaction, was stated at $3,300,000, or $1,100,000 for each of the vessels. The vessels were owned by the Royal Dutch West India Mail.

Sells Sister Vessels

The three ships involved in the sale are practically new, having been built in Holland last year. None has yet been employed on more than one or two voyages. They are exactly alike, their gross tonnage being registered as 5,641 tons, and are 330 feet long with an extreme breadth of 43 feet 6 inches. They are capable of a speed of about 13 knots and have first class accommodations for 111 passengers in addition to two cabins de luxe. According to the terms of sale, prompt delivery of the steamers will be made at Amsterdam. The three ships will be transferred to American registry and will hereafter sail under the American flag, it is announced by the owners.

The fleet of the Grace Steamship Co. will include, in addition to VENEZUELA, COLOMBIA and ECUADOR, a number of freight steamers now being operated by W. R. Grace & Co. in the South American trade, the new SANTA BARBARA, recently delivered from the Cramp ship yards at Philadelphia, and probably SANTA ROSA and SANTA PAULA, both of which are now in the process of construction.

All three of the ships are modern in every particular and are equipped throughout with modern devices. Their introduction into the United States-South American trade is expected to materially improve conditions and is regarded as particularly important in view of the present scarcity of tonnage engaged in this service.

Liquidation of the Pacific Mail Steamship Co., which was undertaken by the Southern Pacific railroad, owner of a majority of the stock, on the ground that it was not profitable to retain the line under onerous burdens imposed by the seamen's act, has been halted, and the company will continue in operation.

The present owners of the majority interest in Pacific Mail are W. R. Grace & Co., who recently acquired 110,800 shares from the Southern Pacific company for $10 a share, after the distribution of $25 a share from the proceeds of the sale of the company's four largest vessels. They have decided, in view of the fact that the Pacific Mail flag is well and favorably known to the trade in Central and South America, to keep the charter alive, and to continue the operation of the Pacific Mail company.

To make this step legal, the stockholders have approved action by their directors looking to the return of the seven smaller ships recently sold to the American International Corporation. These are the steamships PERU, CITY OF PARA, NEWPORT, AZTEC, SAN JUAN, SAN JOSE, and PENNSYLVANIA. The sale of these vessels was effected by the Southern Pacific for a consideration of $1,250,000, and it was announced at the time that they would be operated for the new owners by W. R. Grace & Co. Soon afterward the remaining assets of the Pacific Mail company were acquired by W. R. Grace & Co.

The effect of the new arrangement is to cancel the recent sale of the seven smaller vessels to the American International Corporation, and leave them in possession of the Pacific Mail Steamship Co., now owned and operated by W. R. Grace & Co. There is a close community of interest between the corporation and W. R. Grace & Co.

Officials of the American International Corporation explained that the decision to purchase the vessels had been reached through a desire to keep the American flag on the Pacific, and that when W. R. Grace & Co. obtained possession of the other assets the corporation was glad to cancel its purchase agreement. As a result, the only fleet of American owned vessels in the Pacific will remain intact. Conditions in the shipping trade have undergone such changes through the withdrawal of many vessels on account of the war that it now appears that the line to Central America can be operated at good profit.

Will Seek Pacific Trade

The Gaston, Williams & Wigmore Steamship Corporation will have a capitalization of $5,000,000 and a fleet of about 14 ships to start with. It is incorporated under the laws of Delaware. While it is planned to have both an Atlantic and a Pacific route, it is understood that the large share of the shipping will be in the Pacific.

The Pacific route will be from San Francisco to points in Japan, China and Russia. The port of call in Russia will be Vladivostok. In the Atlantic service, the ships are to run from New York to Archangel, when that port is open to navigation, and it is probable that shipments also will be made to English and European ports in competition with English, French and American lines.

George A. Gaston, head of the firm of Gaston, Williams & Wigmore, Inc., is president of the new steamship company. James A. Wigmore, N. J. Budlong, William H. Williams and R. H. Lee Martin, all connected with the same firm, will be officials of the company. These men will be on the board of directors, and the only other director elected is Charles H. Sabin, president of the Guaranty Trust Co., New York. This banking institution, it has been generally understood, has financed Gaston, Williams & Wigmore, Inc., from the beginning of the war.

Firm's Growth Rapid

Gaston, Williams & Wigmore, Inc., is a new concern, comparatively, in New York City. Starting with a working capital of $1,000 at the beginning of the war in Europe, the firm has established offices in London, Petrograd, Paris, Rome and Havana. It is closely affiliated with Gaston, Williams & Wigmore, Ltd., of Canada, which was organized to operate vessels flying the English and Canadian flags, and which, it was announced yesterday, was about to increase its capital stock to $1,000,000. The New York company, known as the parent organization, has offices in the Guaranty Trust building, and is reputed to have made millions exporting war supplies in large lots to the allies.

The company already has taken over six vessels as a nucleus of its shipping fleet. They are VIRGINIA, which, according to Lloyds Register, is a steel screw steamer of 4,300 tons; LORD DUFFERIN, a steel screw steamer of 4,664 tons; CAROLYN, a steel screw steamer of 3,141 tons; ESKASOMI, a steel screw steamer of 2,761 tons; MARYLAND, a steel screw steamer of 4,731 tons, and O. H. BROWN.

In addition the new shipping combination is taking over two ships of 6,000 tons each, which are now building. The names of these are not given. Six other ships, the names of which are not disclosed, have been chartered, and four more, making the total 18, are to be built as soon as the new corporation is well under way. The company will also take over contracts recently obtained by Gaston, Williams & Wigmore to deliver large cargo steamers built by

the Great Lakes Engineering Works, Detroit.

"The object for which this company was formed was primarily to handle the shipping business of Gaston, Williams & Wigmore, Inc.," Mr. Gaston stated recently. "This company now handles a large volume of freight between New York, Archangel, Vladivostok, London, France, Spain, Portugal and Cape Town."

Some Passenger Ships

The understanding is that most all of the ships in the Pacific service will be freighters, while some of those crossing the Atlantic may carry passengers.

Barges for Mississippi

Regular barge line service will be established between St. Louis and New Orleans this spring, according to recent announcements by John H. Bernhard, president of the Inland Navigation Co. The initial sailing from St. Louis will be April 15.

The company's first barge, of 1,600-ton capacity, with screw propellers instead of paddle wheels, and a wireless outfit with which it can be in communication at any time with the general offices here, has just been completed at the Howard ship yards, Jeffersonville, Ind.

This barge will be the smallest in the fleet. Others are in course of construction, and the plans are being finished now for a barge with 5,000-ton capacity and costing $312,000.

"For years," said Mr. Bernhard recently, "the organizers of the Inland Navigation Co. have been planning and collecting data which would enable them to give service upon the Mississippi river and its tributaries. On June 3 last year the company was organized under the laws of Delaware and capitalized at $9,000,000.

"The company is now in a position to announce that on April 15 its first self-propelled, quadruple screw, all-steel, shallow-draft barge will depart on its initial trip with a cargo of St. Louis products for New Orleans.

"This first barge is capable of delivering its freight at New Orleans in five days, but owing to this being the initial trip our schedule has been liberally figured for the barge to arrive in New Orleans at 9 a. m., April 26. On July 1 we will establish a three-weekly service.

"The barges are so built that we expect to give service during the winter. On the date of the first sailing we will announce definitely how many additional barges will be delivered this year and the tonnage of each, but I may say now our plans are to have 36 barges by the spring of 1918, varying in capacity from 1,600 to 5,000 tons."

New Company Organized

Great Lakes Transit Co. Formed to Take Over Package Freighters

THE Great Lakes Transit Co. has been organized to take over about 85 per cent of the railroad-owned passenger and freight steamships navigating the Great Lakes. W. C. Conners, Buffalo, was elected chairman of the board of directors. The company's fleet will comprise 35 vessels with a freight capacity of about 150,000 tons. They are steamers which six railroad companies were compelled to relinquish under the section of the Panama canal act forbidding rail lines to own competing water routes.

The capitalization of the company, it is announced, will be $20,000,000. Tariffs for through rail-and-water east and west bound traffic will be filed with the interstate commerce commission by April 1. The new rates, it is believed, will not differ from those which prevailed before lake navigation closed last December.

The ships purchased by the company include all except six of those which have been operated on the lakes by the Pennsylvania, New York Central, Erie, Delaware & Lackawanna, Lehigh Valley and Rutland railroads. Among the fleets acquired was that of the Mutual Transit Co., Buffalo, the stock of which was owned jointly in equal amounts by the Lehigh Valley, New York Central, Erie and Lackawanna railroads. The total purchase price has not been announced, owing to the fact that negotiations have not yet been completed for the ownership of terminal properties in several of the lake cities. The company plans to overhaul all its vessels and to begin active operations when the lake season opens. The routes to be selected, it is stated, probably will be the same as those followed by the railroad boat lines. The principal operating offices will be in Buffalo.

Mr. Conners, at the age of 13, was forecastle boy on a lake steamer at $12 a month. James Carey Evens, now vice president and general manager of the Anchor Line, whose boats the new company took over from the Pennsylvania railroad, will be president. Other officers elected, all residents of Buffalo, are: Marvin M. Marcus, vice president in charge of finance; Harry Seymour Noble, vice president in charge of traffic; Edwin T. Douglas, manager in charge of vessel operations; Merton L. White, assistant to the president; W. B. Evans, auditor; L. W. Lake, general freight agent; F. A. Stanley, assistant general freight agent; Harry D. Hosmer, general passenger agent; R. M. Russell, secretary and treasurer.

The vessels taken over are:

SUSQUEHANNA, CODORUS, SCHUYLKILL, MAHONING, MUNCY, DELAWARE, WISSAHICKON, CONEMAUGH, ALLEGHENY, freighters, and TIONESTA, JUNIATA, OCTORARA, passenger and package freight carriers, of the Anchor Line.

TROY, BUFFALO, CHICAGO, MILWAUKEE, DULUTH, UTICA, SUPERIOR, ROCHESTER and BOSTON, of the Western Transit Co.

TIOGA, GRANVILLE RICHARDSON, F. D. UNDERWOOD, DELOS W. COOKE, of the Erie Railroad Lake Line.

NORTHERN KING, NORTHERN QUEEN, NORTH WIND, NORTHERN WAVE, NORTHERN LIGHT, NORTH LAKE, NORTH SEA, NORTH STAR, of the Mutual Transit Co.

AVERILL and HASKELL, of Rutland Transit Co.

Lehigh Retains Vessels

The Lehigh Valley is the only railroad which has not disposed of its vessels. Its lake organization, the Lehigh Valley Transportation Co., expects to operate its fleet of six freight vessels between Buffalo, Chicago and Milwaukee, during the season of 1916. The Lehigh Valley has secured a temporary injunction from the United States court for the eastern district of Pennsylvania against the enforcement of the interstate commerce commission order and preparations have been begun to put the vessels into commission. The temporary injunction granted by the court means there will be no interference with the lake line operations until the court has had a further hearing of the case on March 17 and rendered its final decision in reference to the questions involved. The Lehigh Valley was the only road which decided to test the validity of the ruling of the interstate commerce commission. The Lehigh Valley contends that its lake vessels do not come under the order inasmuch as the railroad has no lines running west of Buffalo.

The Lehigh Valley fleet consists of the steel freighters BETHLEHEM, SARANAC, TUSCARORA, SENECA, WILKESBARRE and MAUCH CHUNK. The last two have a carrying capacity of 6,000 tons each, the others 3,000 tons each. The boats carry general grain and package cargoes.

The Port of Astoria, Ore., is preparing plans for two vessels. One will be constructed as soon as possible, and will ply on the Columbia river between Astoria and Lewiston, Ida. The boats will cost about $60,000 each and will be 325 feet long with five foot draft.

High Freight Rates Curb Traffic

Carrying Charges on the Pacific Are Now So High That Traffic is Hampered—Chinese Ship Yards Busy

ALTHOUGH freight traffic along some routes in the far eastern trade is not heavy, the freight rates on practically all lines between the Orient and Europe and the United States have again been advanced, or are about to be advanced. Increased freight charges will probably be made on all lines of trade, according to a recent summary furnished the department of commerce by Consul General George E. Anderson, Hongkong, China.

Formal announcement has been made by the conference lines of an advance of 20 per cent in the freight rates between the far east and the eastern coast of the United States by way of the Suez canal, and shippers have been informed, more or less formally, by the Pacific conference lines, that a similar advance will shortly be effective for transpacific traffic. While the temporary closing of the Panama canal is said by shipping people to have had some influence upon this increase, the plain facts seem to be that ships are needed in other parts of the world to such a degree that they will be taken from the far eastern run unless the rates announced can be obtained and ships be filled at such advanced rates.

The rice crops in Indo-China, Siam and Burma are unusually large, and the demand for tonnage for the movement of this crop has stiffened freights both locally and in world service. No element in the situation promises any weakening in the demand for vessels. Norwegian ship owners, who in some respects reflect best the general position of ship owners the world over, are refusing to let their ships on less than two years' time charter, at very high rates. While, for instance, the Nippon Yusen Kaisha, the chief Japanese line concerned in European and American trade, is maintaining a service of 11 liners and four additional ships, together with six other ships which return to the far east by way of New York, there is a scarcity of tonnage for Europe at present, and many commodities which can move generally at comparatively low freights only, are held up in far eastern ports.

Buying Power of Chinese Reduced

The most serious phase of the situation is the effect the high rates are having upon business generally. A very large share of Chinese produce for the United States—goods moderate in value for their bulk—raw materials, particularly of the class in which German firms have succeeded in building up a good trade in recent years, cannot be moved under present freight rates. This not only reduces exports from the far east, but at the same time reduces the buying power of the Chinese people materially, and affects import trade just as seriously.

Under normal conditions this situation would right itself in time, but at present no reduction in freight rates can be justified here, so long as there is a demand for vessels elsewhere at high rates. The situation is particularly unfortunate for American trade, which consists so largely of goods in both import and export lines in which freight rates are a dominating factor. The export trade in flour, lumber and machinery, particularly, will be affected.

Hongkong Ship Yards Busy

The large ship yards of Hongkong under certain conditions can build ships as cheaply as any yards in the world. Usually the necessity of obtaining steel plates from abroad serves to counteract many of the advantages the industry has otherwise in Hongkong. Despite the fact that much of the steel now obtained in Hongkong is bought at high freight rates, and in competition with American yards, the Hongkong yards are now building ships in competition with the ship yards of Europe, and are building them as cheaply as the cheapest. All the ship yards in Hongkong capable of building ocean vessels have work to their full capacity.

In the two larger Hongkong yards, 14 new vessels are now under construction or will be built as soon as room can be made for them. These vessels include three new ships for the Blue Funnel Line's "Straits Steamship Co." extension, and three new ships for the China Navigation Co.'s coast service between Shanghai and Hongkong, at the yard of the Taikoo Dock Yard & Engineering Co. At the yard of the Hongkong & Whampoa Dock Co., Ltd., six new ships are being built for Messrs. Bruusgaard Kjosterud & Co., Drammen, Norway, and two for Messrs Hans Kiaer & Co., of the same place. Two other vessels of the same class will be started shortly, and three others are contracted for. Two vessels also are under construction for the Siam Steamship Co. In addition, a large amount of work is being done in overhauling and repairing old vessels.

Build Coasters

The vessels for the China Navigation Co. are of the same style as the vessels of that company now on the coast run, except that they will have considerable additional modern equipment. Their tonnage is about 500 tons each. The vessels under construction for Norwegian interests are all of similar type. Those for Messrs. Bruusgaard Kjosterud & Co. are single-screw steel steamers, 270 feet long, 40 feet in breadth molded, 21 feet 6 inches in depth molded, with a gross tonnage of 2,170, and a registered net tonnage of 1,400. The vessels are of the two-decked type, with poop, bridge and topgallant forecastle, and four water-tight bulkheads. They will carry 3,000 tons dead-weight on 18 feet 6 inches mean draught, and are expected to make 10 knots an hour.

In Vladivostok Trade

The well-known Seattle shipping firm of James Griffiths & Sons, Seattle, recently announced its intention of entering the Vladivostok trade, which since the beginning of hostilities has become one of the largest and most remunerative on the Pacific. It is declared that the Griffiths interests contemplate the formation of a fleet of considerable proportions for this trade. Its nucleus will be ASAMA MARU, which was recently chartered and is now en route to the Siberian port with a full cargo.

Captain James Griffiths and his sons have for many years been active in north Pacific maritime affairs, engaging in general shipments to the north and in the freighting of copper ore and concentrates from British Columbia mines to Puget sound smelters, also in stevedoring, barge and other business of the kind. With their advent, Seattle will have six steamship lines operating in the Vladivostok trade. The others include Frank Waterhouse & Co., H. F. Ostrander, the Osaka Shosen Kaisha, the Robert Dollar Co. and the Blue Funnel line.

Cleveland Ship Yard is Improved

American Ship Building Co. Has Completed Important Extensions —New Foundry, Machine Shop and General Office Provided

By F. A. Churchill Jr.

THAT the prosperity now enjoyed by many branches of American industry as a result of war demands, is to be short-lived, is an assertion frequently heard. While this may be true in certain cases, it seems difficult to believe that a stimulus such as that which has been imparted to American ship building by the present world shortage of merchant tonnage, will spend itself without lasting benefit. A visit to any large ship yard on either coast or on the Great Lakes, will reveal numerous and costly improvements in shop and yard facilities, which indicate an abiding faith, on the part of the ship builder, in the renaissance of the nation's maritime industry.

An example of the unprecedented activity and the heavy demands now being made on building resources, is furnished by the American Ship Building Co., which maintains yards and docks at Cleveland and Lorain, O., and through close affiliation with a number of other organizations, commands facilities at several other Lake ports. During the past season this company has not only experienced a greatly augmented demand for Great Lakes tonnage, but has also received many inquiries for vessels to be employed in coastwise and foreign commerce. So acute is the situation abroad that work is now being rushed on two large merchant steamers for Norweigan owners, at the company's Cleveland yards.

Augments Cleveland Plant

In order to cope with the increasing flood of orders, the American Ship Building Company has recently completed extensive improvements at its Cleveland plant, including a new office building, foundry, pattern shop and machine shop. The new buildings are situated at the foot of West Fifty-fourth street, in close proximity to the company's slip and dry dock. The property is near the New York Central railroad main line. The arrangement of the new buildings is illustrated in Fig. 5. The office building is a substantial three-story structure of fire proof brick construction, occupying a space of 58 x 100 feet fronting on Edgewater boulevard. The ground floor is utilized as a storeroom, with offices for the storekeeper and the timekeepers. On the main floor are offices for the president and directors, the general manager and his assistants, the general superintendent, the secretary and treasurer and the cashier. This floor also houses the order, purchasing and accounting departments. On the upper floor, the engineering and hull departments occupy the west and east wings of the building, respectively, with adjacent offices for the chief engineer and the naval architect of the company. The principal drafting rooms are commodious and well-lighted, the large window space being augmented by Gale-Webb electric extension lights over the tables. Each department is provided with a large fireproof vault for the storage of drawings, which are arranged in file cabinets on a convenient card index system. At the rear and adjoining both departments is a blue print room, with sun frames and an electric arc blue printing machine. On this floor is also a technical library for the use of designers, draftsmen and engineers.

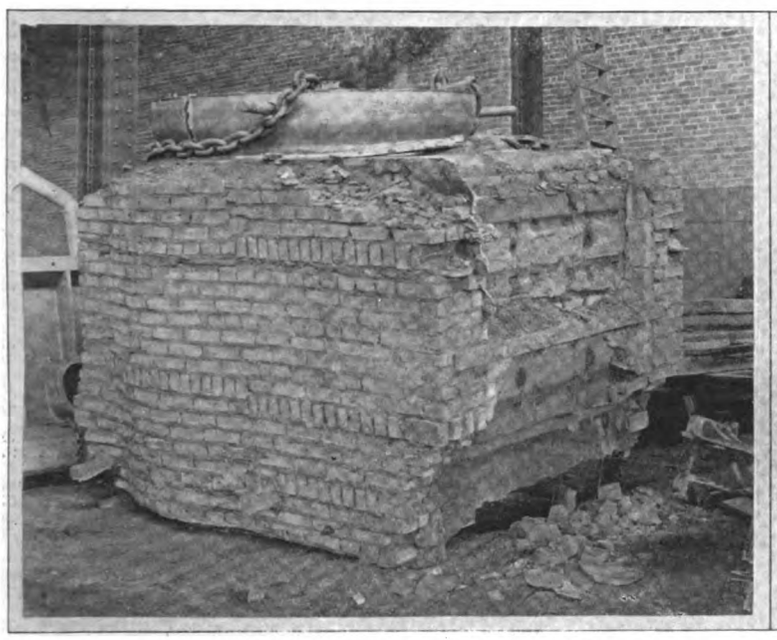


FIG. 1—LOAM CASTING, LOW PRESSURE CYLINDER FOR NORWEGIAN STEAMSHIP

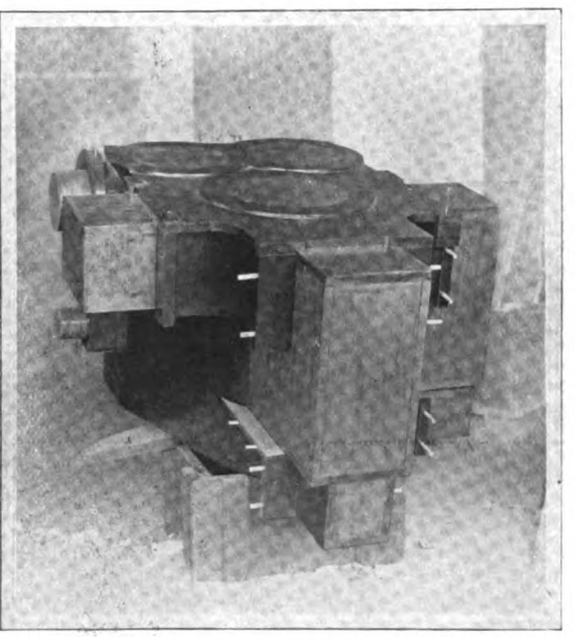


FIG. 2—PATTERN FOR CIRCULATING PUMP CASTING

Between the office building and the foundry and machine shop building is situated the pattern shop and pattern storage building. It is concrete, faced with red brick, and is 100 x 200 feet in dimensions. The pattern shop occupies a space of 60 x 100 feet on the ground floor at the front of the building. The remainder of the ground floor is devoted to the storage of large patterns, which it would be im-

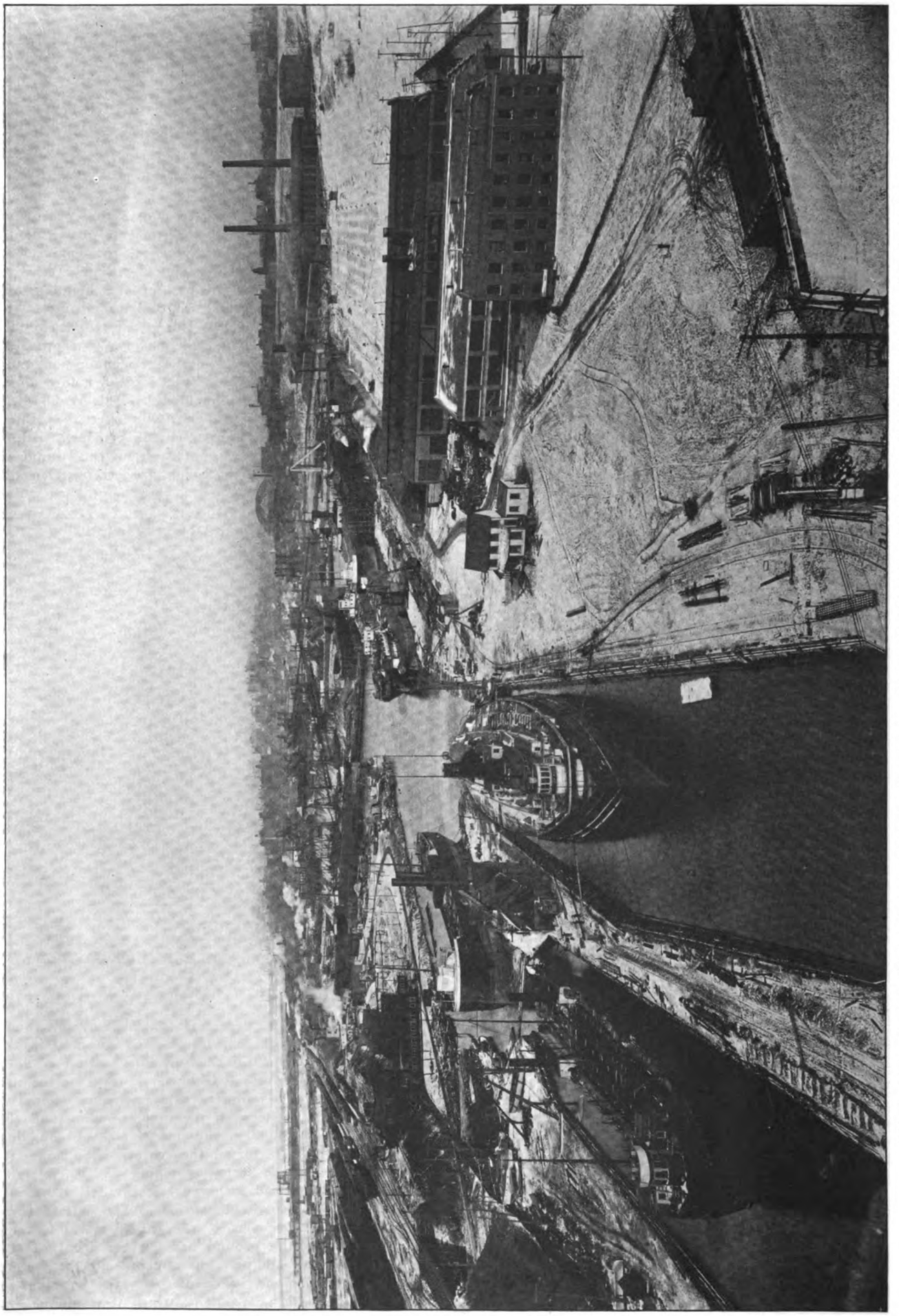


FIG. 3—PLAN OF AMERICAN SHIP BUILDING CO., CLEVELAND, SHOWING NEW BUILDINGS AT RIGHT AND DRY DOCKS AT LEFT

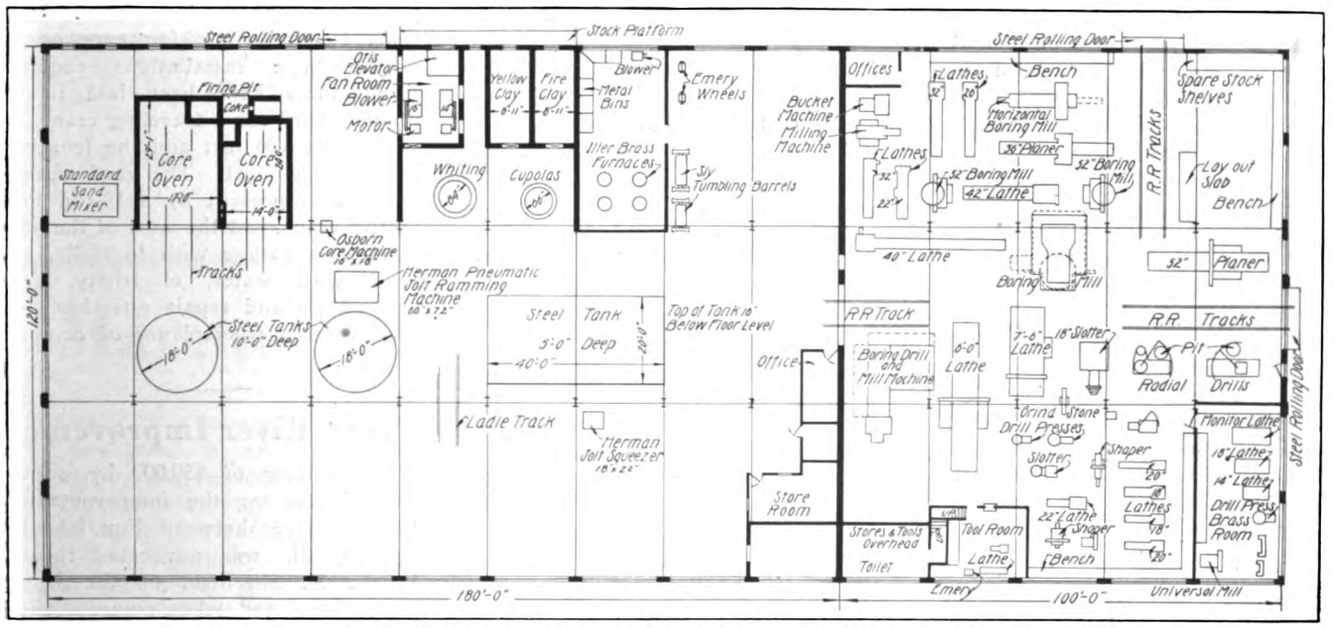


FIG. 4—LAYOUT OF FOUNDRY AND MACHINE SHOP, AMERICAN SHIP BUILDING CO.

possible to place on racks. The entire second floor is occupied by pattern storage racks.

Owing to the wide diversity in the character and size of patterns required in the construction and repair work of the company, the equipment of its pattern shop is necessarily complete, including two band saws, two joiners, one pony planer, one core box machine, two stub lathes, two long lathes, two trimmers, one band saw filer, and a power grindstone. Power for these tools is furnished by an electric motor. The pattern shop and storage building is equipped with steel sash of the Fenestra type and with Kinnear steel doors on both floors. About 16 men are employed.

The foundry and machine shop are situated in one building, 120 x 280 feet, with a dustproof division wall, as illustrated in Fig. 4. The foundry occupies a ground area of 120 x 180 feet, while that alloted to the machine shop is 100 x 120 feet. The building is of steel construction, faced with brick laid up in black mortar. The main bay is 40 feet wide, with east and west side bays of the same width. Steel sash and ribbed glass windows of large dimensions provide excellent lighting facilities. The roof is of gypsum with a tar paper and gravel covering. Kinnear steel doors are also provided.

Equipment of Foundry

Equipped with one 84-inch and one 66-inch Whiting cupola, with a combined capacity of 18½ tons per hour, also with four Iller brass furnaces, the combined capacity of which is 630 pounds per melt, the foundry produces from 20 to 25 tons of castings per day, about 120 men being employed. The product of the foundry is highly diversified, including as it does every type of casting employed in the construction of a ship, from bed plates, cylinders and condensers to small fittings; the castings range upward to 15 tons in weight and vary widely in design. Owing to the fact that the company's plant is situated at the foot of a hill, with a consequent heavy ground moisture, pit work is taken care of in three large steel tanks set in the floor. These tanks preclude the possibility of drain water entering the molds. As shown in Fig. 4, one of the tanks is rectangular, being 20 feet wide, 40 feet long and 5 feet deep. The other two are cylindrical, being 18 feet in diameter and 10 feet deep. The floor is composed of cinders and 2 feet of molding sand. One 30-ton Pawling & Harnischfeger electric crane equipped with a 5-ton auxiliary hoist, one 25-ton Niles electric crane and two 7-ton electric cranes furnished by the Northern Engineering Works, Detroit, serve the foundry. The auxiliary equipment for handling materials includes two pneumatic jib cranes of the company's own manufacture.

As illustrated in Fig. 4, the foundry is furnished with two large core ovens,

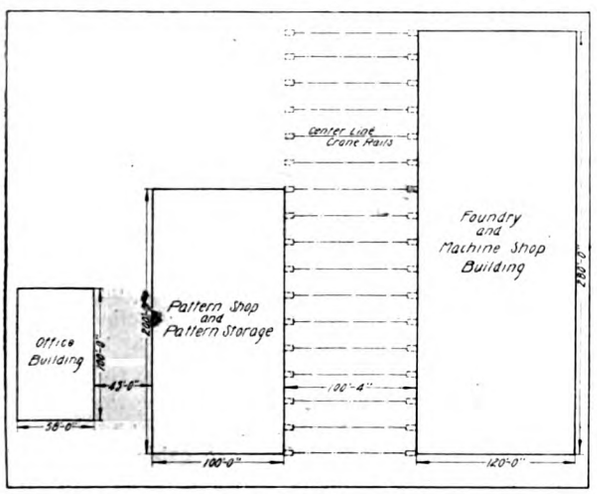


FIG. 5—ARRANGEMENT OF BUILDINGS, AMERICAN SHIP BUILDING CO., CLEVELAND

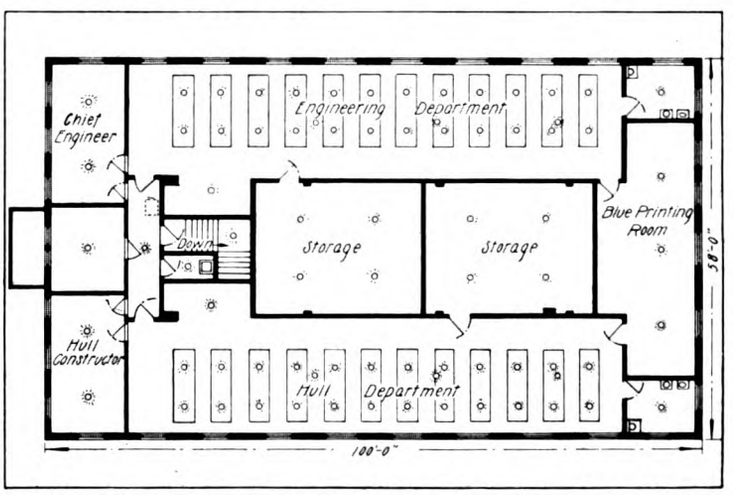


FIG. 6—PLAN OF HULL AND ENGINEERING DEPARTMENTS, OFFICE BUILDING

one approximately 17 feet wide, 29 feet deep and 10 feet high, and the other 14 feet wide 24 feet deep and 10 feet high. These ovens, which are of the drawer type and are coke fired, were installed by the Coleman Foundry Equipment Co., Cleveland. Comparatively few molding machines are employed, the diversity of the work precluding the possibility of routine machine practice. The machine equipment includes one Osborn 16 x 18-inch core machine, one Herman 60 x 72-inch pneumatic jolt-ramming machine and one Herman 18 x 20-inch jolt-squeezing machine. Two Sly tumbling barrels with motor-driven dust arresters and a sand mixer, furnished by the Standard Sand & Machine Co., Cleveland, have also been installed.

Method of Charging Cupolas

The cupolas are charged from a steel platform, 22 x 40 feet in dimensions and 14 feet in height, extending partly into the foundry yard. In addition to a 5-ton Otis hydraulic elevator, a 10-ton Industrial crane, which is situated in the yard, may be utilized to supply the charging floor.

One 16-inch and one 14-inch blower, manufactured by the Buffalo Forge Co., Buffalo, each independently driven by a 50-horsepower Reliance electric motor, are provided. Sufficient draft can be furnished by either blower to supply both cupolas at full capacity. Five sand bins, each 10 x 10 feet in dimensions, and two clay bins, each 12 x 21 feet in dimensions, on the west side of the foundry, are so arranged as to be filled by the yard crane directly from the cars, and to discharge inside the building. Iron and coke are stored on the charging platform. The capacity of the sand bins is about 18 carloads. A large, modern lavatory with lockers and shower baths, a store room and a foremen's office are situated in the northeast corner of the foundry.

The machine shop is designed primarily for handling repair work, but also is equipped to build auxiliary machinery. It is served by a 25-ton Pawling & Harnischfeger and a 7-ton Northern electric crane. All the larger tools are equipped with individual motor drive, direct current being supplied by a 100-kilowatt Allis-Chalmers motor-generator and by a 30-kilowatt Card generator driven by a 50-horsepower Westinghouse motor. The floor is of massive concrete construction, with standard gage tracks leading into the shop in order to facilitate the loading and unloading of heavy castings directly from the cars. The equipment of the machine shop includes a 10-foot Niles vertical boring mill, a Beaman & Smith horizontal boring and milling machine, boring mills, lathes, planers, slotters, millers, radial drills, a bucket machine and power grinding machines. About 100 men are employed.

Builds Supplementary Shop

In addition to the office, pattern shop, foundry and machine shop buildings, which were built by Crowell, Lundorff & Little, Cleveland, the American Ship Building Co. is erecting a 40 x 160-foot structure adjacent to the new machine shop. The west end of this building will house the electrical department, as well as the two motor-generator sets which supply current for the machine tools. A 60-foot space in the center will be set aside for a tin and copper shop, while a pipe shop of similar size at the opposite end will be equipped with three pipe-threading machines and other tools capable of taking care of the largest pipe installations required. Foundations have been laid in the foundry yard for a traveling crane, the span being 100 feet and the length of the yard 280 feet. The yard work is handled at present by a 10-ton locomotive crane. At the west of the office building a garage with 14 stalls, supplied with water, electricity, compressed air and repair pits, has been built for the convenience of company officials.

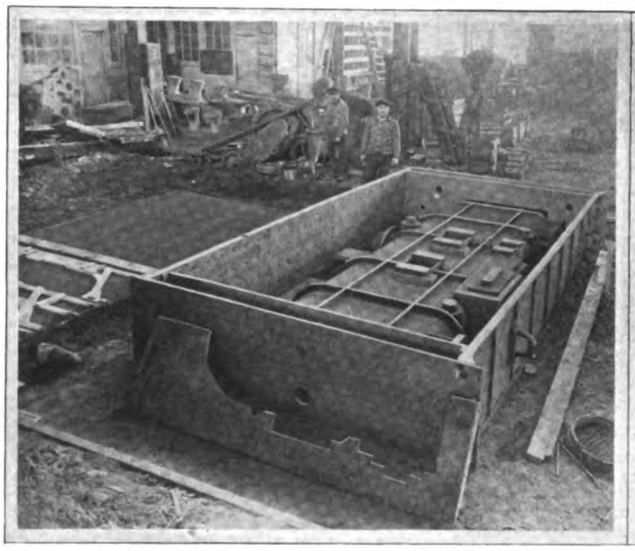


FIG. 7—PREPARING MOLD FOR CONDENSER CASTING

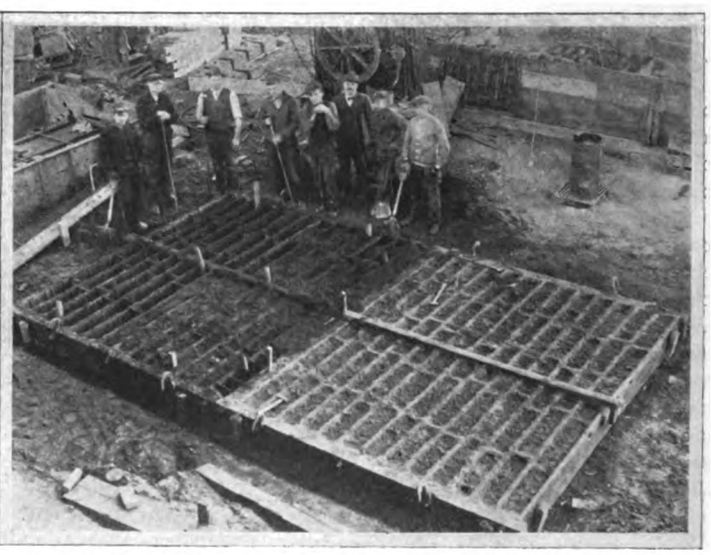


FIG. 8—MOLDING BED PLATE FOR NORWEGIAN MERCHANT STEAMSHIP

Urges River Improvement

The raising of $50,000 by popular subscription for the improvement of the Fox river between Fox lake and Aurora, Ill., was advocated recently by L. K. Sherman, of the Illinois state rivers and lakes commission, at Elgin, Ill. "For this sum," declared Mr. Sherman, "a stretch of 66 miles could be made navigable for small craft. Adding the distance from Aurora to Yorkville, which will make the total distance about 79 miles, the entire cost would be $65,000. The proposed channel which would have to be cut would be at lowest water, 3 feet deep and 20 feet wide. For crossing the dams, nine or 11 in number, and having a lift of from 5 to 10 feet each, the plan proposes an inexpensive type of marine railway. This device consists of two trestle inclines, with cars on each of the upper and lower incline and a cradle on wheels, which holds the boat and on which it is rolled from the lifting car to the lowering car. The cars are pulled up and lowered by means of a wire cable attached to a hoisting winch preferably operated by a small electric motor."

What the Government is Doing

Rulings on Marine Matters **Improvements to Waterways**

Hints to Navigators

Marine Safety Devices Are Exhibited

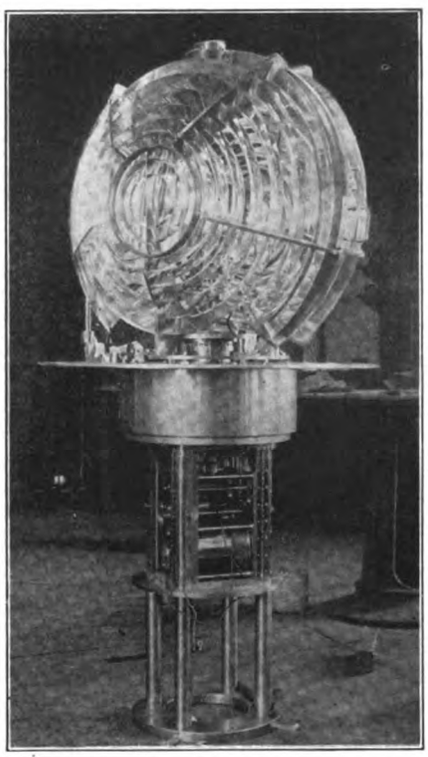
EXHIBITS of the steamboat inspection service, the coast and geodetic survey and the bureau of navigation of the department of commerce aroused much interest at the national safety first exposition given in the national museum in Washington from Feb. 21 until Feb. 26. The exhibit was considered to be easily the most unique and elaborate of the kind ever held anywhere. It was attended by prominent public citizens from all sections of the country, manufacturers, and many state officials who discussed a system of standard classification of accidents to be used in connection with the workmen's compensation laws as operated in 31 states of the union.

There is always something unusually fascinating about things marine and the attractions offered by the government agencies which have charge of these matters proved no exception to the rule, as was shown by the attention given them at the exhibit.

The coast and geodetic survey is a prominent safety first organization for the federal government in that its business is to locate the hidden dangers of the seas and to chart them for the benefit of vessels. This survey uses a unique wire drag in locating obstacles under the sea and does not any longer rely upon sounding with a lead line as a means of detecting submerged dangers. This work is intensely practical and productive. The increasing demands for new hydrographic surveys due to the increased size, drafts and speed of ships, and the development of submersible ships of war, together with the constant changes in depth and in form of bottom arising from the movements of sand, on the Atlantic shores, call for the constant making of new surveys and resurveys of the most vital importance to the country.

Wire Drag Surveying

The use of the wire drag has revolutionized hydrographic surveying. It has long been known that sounding with a lead line was not an infallible means of detecting submerged dangers. This is emphasized by the large number of such dangers which have become known and are shown on the charts only as the results of wrecks that have occurred upon them. It has not been well known, and only the development of the wire-drag work within a recent period has made it clear, that a large number of submerged dangers may and do exist in much-frequented waters, being unknown and unsuspected merely because by chance no vessel of considerable draft has happened to pass immediately over it. During the past summer, several such dangers have been discovered in the waters, many times surveyed, of Massachusetts bay, unpleasantly near the port of Boston.



FOURTH ORDER LIGHTHOUSE LENS MADE IN AMERICA

The bureau of navigation is charged with the enforcement of the radio communication laws of the United States. So great has been the saving of human life through radio communication, that the United States now has a law which requires that any steamer of the United States or of any foreign country navigating the ocean or Great Lakes and carrying 50 or more persons, including passengers or crew or both, shall not attempt to leave port unless the steamer is equipped with an efficient apparatus for radio communication capable of transmitting and receiving messages over a distance of at least 100 miles day and night. An auxiliary power supply, independent of the vessel's main electric power plant, must be provided which will enable the sending set to operate for at least four hours.

During the fiscal year 1915, the radio inspectors of the bureau reported that 26 vessels left ports in the United States and met with accidents or disaster requiring the use of wireless to summon assistance. Four of these accidents were caused by fire; 12 by running ashore, stranding or getting into an ice jam; three were due to the breakage of machinery; four resulted from collisions; one from shifting of cargo, and one vessel was torpedoed. Excepting the case of LUSITANIA, which was torpedoed, the assistance rendered resulted in but two lives being lost. Since the close of the fiscal year, the following disasters have occurred:

Reservists Are Saved

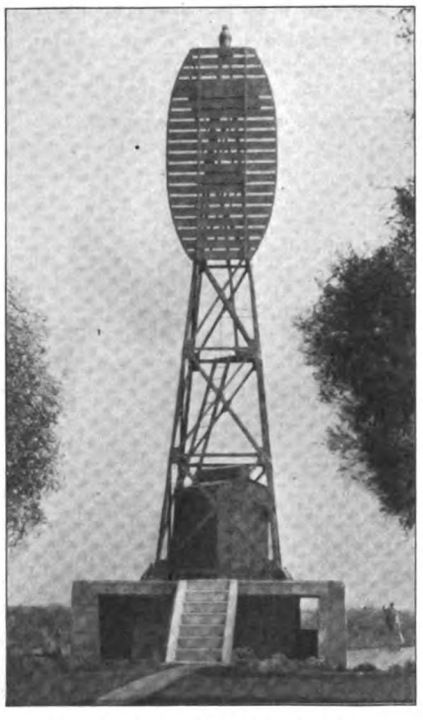
On Sept. 3, 1915, the Fabre Line steamship SANTA ANNA, bound from New York to Naples with 1,700 Italian reservists and crew aboard, caught fire in midocean and all persons on board were saved. The SOS call brought the steamship ANCONA to the assistance of the disabled vessel, and 600 persons were taken off. SANTA ANNA then proceeded to port, convoyed by ANCONA, and the entire 1,700 passengers and crew saved. Six days after the SANTA ANNA disaster, the Greek liner ATHINAI, bound from New York to Piraeus, caught fire in mid-ocean and was abandoned by the passengers and crew, numbering 470. The call for assistance was answered by the steamships TUSCANIA and ROUMANIAN PRINCE; 341 persons were taken on board TUSCANIA, the remaining 129 being taken off by ROUMANIAN PRINCE. The vessel was entirely destroyed.

The use of radio apparatus on vessels carrying passengers, or with a crew of 50 or more, is now accepted as essential

to the safety of those on board. An instance of the value of radio communication was shown in November, 1913, when Great Lakes storms destroyed 19 vessels, none of which was equipped with wireless. It is said that all vessels having radio apparatus installed received warning of the coming storm and sought safety.

Lighting Detroit and St. Mary's Rivers

On few navigable rivers are buoys and range lights used so extensively and advantageously as along the Detroit and St. Mary's rivers in Michigan. Distinct characteristics are maintained in each light, either in the supporting structure or in the light itself, and frequently in both. The range lights shown in the accompanying illustrations show char-



ECORSE REAR RANGE LIGHT, DETROIT RIVER

acteristic distinguishing structural variations.

The Detroit river is divided on the navigator's chart into three channels: east, west and Livingstone. The east channel is marked by one Pintsch combination gas and bell buoy having a red light, and two Pintsch gas buoys, one red and one white. The west channel is marked by three Pintsch gas buoys showing a white light. The Livingstone channel is marked by 12 Pintsch gas buoys, five red and seven white. All of the Pintsch buoys in the Detroit river flash a signal of five seconds light and five seconds dark. In addition to these buoys there are four Pintsch range lights on the Detroit river, which carry a fixed red light.

The St. Mary's river is safeguarded by 12 Pintsch range lights, eight of which have a fixed white light and four a fixed red light.

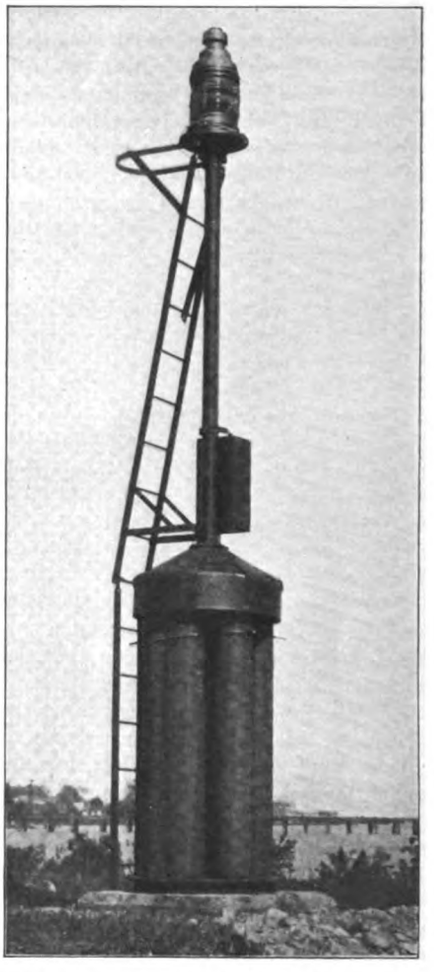
On Lake St. Clair are 12 Pintsch buoys and one Pintsch beacon. The use of high pressure flasks for the storage and shipment of Pintsch gas has brought about a number of changes in the operation of beacons, range lights, lightships and unwatched lighthouses. The high pressure flasks are 6 feet long and 9 inches in diameter and weight about 230 pounds, their storage capacity of the high pressure flasks being over nine times that of the old low pressure holders.

Trade Route Changed

The federal department of commerce, through the coast and geodetic survey and bureau of lighthouses, has recently surveyed and marked a safe passage through the Sulu sea of the Philippine islands, a body of water covering 50,000 square miles, extending from the southeast coast of Palawan to the northwest coast of Mindanao, and from the northeast coast of Borneo to the southwest extremity of Panay. Over this vast area little has been known of the great depths and isolated sand cays and coral reefs, save for a few scattered soundings and approximate locations of reefs, made by early navigators, which of themselves served to warn navigators in modern steamships from using its waters. The entire region has been considered so dangerous that its navigation from the southern island ports of Iloilo, Cebu and Zamboanga of vessels enroute to the Suez or the west coast of Borneo and Sumatra has been forbidden by the underwriters, necessitating that water-borne commerce be carried hundreds of miles from the most direct course.

During the early days of the present European war it was obviously necessary that merchant vessels of the warring nations seek the less-frequented parts of the sea, and the rerouting of commerce demanded that a track across the Sulu Sea be discovered and developed if it existed. The coast survey steamer PATHFINDER was ordered to survey a track that would shorten the distance from the Philippine ports to Singapore and the Suez, and determine the true positions of all islands, reefs, and cays along such a route through the Sulu sea. Soundings were taken at frequent intervals and a track from 10 to 15 miles broad and 260 miles in length was practically completed.

The old courses across the Sulu sea, used by the Royal Spanish Mail and the more venturesome tramp steamers, required five changes of course, while the new route requires but two changes of course, furnishes immunity from the ordinary dangers of unknown waters, and lessens what was previously considered a safe route by approximately 200 miles. Following the survey of the new direct track, the bureau of lighthouses of the Philippines placed two large steel towers with flashing acetylene lights



LIGHT AT LITTLE RAPIDS CUT, ST. MARY'S RIVER

at the two turning points in the course. The lights are each visible for 14 miles, forming as they do a link in a chain of lights extending in almost a straight line from Iloilo to Balabac straits and the southern part of the China sea, a distance of 370 miles. These light towers are placed on low cays, which show by a few feet above the sea, and close to the new route, thus changing some of the most serious dangers along the route into efficient aids.

Issues Report on Navigation Laws

Department of Commerce Makes Exhaustive Study of Maritime Acts of All Civilized Nations and Claims American Statutes Are Up-to-Date

A SUMMARY of the navigation laws of the leading maritime nations is contained in a recent bulletin of the bureau of foreign and domestic commerce, department of commerce. The laws of the United States, Great Britain, Germany, Norway, France and Japan are summarized. The report furnishes the first convenient synopsis of such laws and permits comparisons to be drawn readily between American and foreign regulations. The bulletin was prepared by Grosvenor M. Jones and can be secured from the superintendent of documents, government printing office, Washington, for 20 cents.

Exclusion of Foreign Officers

The bureau summarizes the contents of the report as follows:

Emphasis is frequently laid upon the fact that our laws require American ships to be officered by American citizens. Upon making a comparison of the laws in the bureau's report, it is found that the laws of Japan provide that no foreigner may be employed as an officer on a vessel of a subsidized company without government approval. Norway and Germany do not expressly prohibit the employment of foreign citizens, but the fact that applicants for licenses as officers are required to pass examinations in Norwegian and German, respectively, practically excludes persons of other nationalities.

A further study of the principal features of the different navigation laws shows that the United States is the only one of the selected countries to require the employment of a certain fixed proportion of able seamen in the deck department of vessels operated under the national flag. This requirement was introduced by the seamen's act. The foreign requirement corresponding nearly to this, is that of the British board of trade rules of 1911 for emigrant ships, which stipulates a fixed number of able-bodied seamen and ordinary seamen, as well as officers, for all emigrant ships classified according to under-deck tonnage. And all British steamships, whether emigrant ships or not, are required to carry a certain number of "efficient" deck hands, the number varying with the tonnage and length of vessel.

All the selected countries, except Japan, have laws requiring adequate quarters for the crew. Germany, since 1905, has required 123 cubic feet of air space in the sleeping quarters for each sailor, and France has required the same space since 1908. England fixed its requirement at 120 feet in 1907, and Norway adopted this minimum in 1909. Requirements for American vessels were not raised to 120 feet until 1915.

The provision in the seamen's act for a new class of sailors designated as "certified lifeboat men" has been the subject of much discussion. The bureau's report brings out the fact that a British commission appointed especially to investigate the subject of lifeboat equipment, recommended as far back as 1912 that two "efficient boathands" should be carried for each lifeboat and that "facilities should be given to enable all hands to prove their competency as efficient boathands." However, parliament has not yet adopted this recommendation. A German rule promulgated in March, 1898, requires that emigrant ships shall carry at least two adult persons in the crew for every collapsible boat; at least three for every ordinary rigid boat, and at least four for every regulation lifeboat.

Vessel Inspection Laws

Considerable attention is given to strictness and detail of vessel inspection in the selected countries. The testing of boilers is of particular interest because the American test has been called unduly severe. A hydrostatic or hydraulic test is applied at regular intervals to boilers on British, German, Norwegian, French and Japanese ships as well as those under the United States flag. In this country, the test pressure is one and one-half times the maximum allowable working pressure of the boilers. In Great Britain the test pressure is twice the working pressure for new boilers and from one and one-half to one and three-fourths times the working pressure for old boilers. In Germany and France the general rule is to make the test pressure one and one-half times the working pressure.

One of the features of the German regulations is the requirement of a rigid physical examination of all sailors on German vessels. This rule has long been in force, and the examination seems to be even more severe than that required by the new seamen's act. Norwegian sailors are also required to pass a searching physical examination, but seemingly nothing of this sort is asked of sailors on British, French and Japanese ships.

A much talked of feature of the seamen's act has been the language test requirement. The British have a similar test in their British merchant shipping act of 1906, which provides that no seamen shall be employed upon any British ship at any port in the United Kingdom or on the continent between the river Elbe and Brest unless he possesses "a sufficient knowledge of the English language to understand the necessary orders". This law, however, does not apply "to any British subject, inhabitant of a British protectorate, or to any lascar."

Measurement Rules Are Liberal

The measurement rules of the United States have often been criticized as giving our vessels a higher tonnage than the rules of other countries impose upon their vessels. Since the tonnage of a ship is the basis of various port and other charges, complaints against an excessive tonnage rating are natural. Upon comparing the measurement rules of the several countries, as given in the bureau's report, it would seem, however, that the American rules are now fully as liberal as those of the other countries.

American shipowners, with the exception of those operating ships under the ocean mail act of 1891, are not restricted in the employment of their crews by any requirement as to the nationality of seamen. British, German and Japanese shipowners are likewise unrestricted, but British ships receiving mail or admiralty subventions must be manned to a large degree by British sailors, while subsidized Japanese ships may employ foreign sailors only with the consent of the government. French ships in general must have at least 75 per cent of the crews French citizens, while the proportion of foreigners that may be employed on Norwegian ships is definitely fixed by statute and varies from one-third to one-half.

One chapter in the report is devoted to the manner in which the different countries enforce their navigation laws, and in view of the demand for a federal shipping board this chapter has a peculiar interest.

Lake Ship Builders Busy

IN ITS annual ship building and fitting out number, February, 1916, *The Marine Review* published comparative tables of merchant marine construction showing graphically the tremendous gain the industry had made in less than a year. It was asserted by doubters that this impetus would not endure for long. Subsequent statistics compiled by *The Marine Review,* covering ship yards on the Great Lakes, prove absolutely that there is no reason to fear a cessation of activity for a long time to come. Famed as they are for their high standards of construction and first class facilities, Lakes ship yards may be taken as a barometer of conditions prevailing from coast to coast, in this instance. A striking feature of their activity since the first of the present year is the large number of contracts taken from foreign governments and individuals. Nearly a score of freighters, including package carriers, tankers and colliers, are now being built on the Great Lakes for Argentine or Scandinavian interests.

During the year 1915, only six steam vessels were built in Great Lakes yards, a total of 14,933 gross tons. But one of these, W. F. WHITE, was destined for use on fresh water.

By New Year's day, 1916, however, the worldwide shortage of merchant tonnage had become so acute as to make itself felt in every quarter where a possibility of relief existed. In spite of the fact that the dimensions of the Welland canal limited the length of lake-built vessels passing to the ocean, to 261 feet, with a similar curtailment of breadth and depth, no less than 36 ships were in course of construction on the lakes, nine of which were designed for bulk freighting on their native waters, the other 27 ships being designed for commerce of every sort in the four corners of the earth. They represented a total of 100,231 gross tons.

Recent Activity

Since the first of the present year, the rush of prosperity to the ship builders of the lakes has not abated; in fact, it appears to be on the increase. The demands of such neutral European and South American nations as are determined to profit by the existing condition of the great maritime countries of the world, are rivaled by the awakening interest of our own people, who are not aiming so much for an immediate profit as a future place in the maritime sun.

During the first two months of 1916 Great Lakes ship builders obtained 12 additional large contracts. Three of these are 600-footers for the Pittsburgh Steamship Co., to be used in the carrying of ore and other bulk freight, two of them being built by the American Ship Building Co., Cleveland. This yard has also accepted two ocean-size freighters for Canadian register, as well as an ocean-size barge for the Standard Oil Co. The Toledo Ship Building Co., Toledo, O., has taken four freighters for Norwegian interests, to be of the largest dimensions capable of passing to salt water, while the Manitowoc Ship Building & Dry Dock Co., Manitowoc, Wis., has two motor ships of similar size under way for Berg, Hanson & Co. Officials of lake ship yards declare that inquiries are received daily as to facilities and delivery dates. Most yards are increasing their capacity as rapidly as possible to cope with the business at hand.

Relocate Alaska River

On the eastern shore of Bering sea, from Nunivak island to Nushagak, stretches what is perhaps Alaska's most unfrequented coast line, touched by waters leading into an even less frequented river. For the past five seasons a steamer of the United States coast and geodetic survey, of the department of commerce, has been engaged on the field work connected with the chartering of the approach and entrance to the Kuskokwim river, a work just completed during the past season by the steamer YUKON.

As a supplement to the coast work a reconnoissance survey was made inland from Bethel, the head of deep-sea navigation. This was carried for 550 miles to McGrath, the main settlement on the upper river from where on a clear day, Mount McKinley can be seen 150 miles to the eastward. A river steamer can ascend beyond here for 200 miles, while the river with its tributaries offers 1,200 miles of navigable waters.

The QUICKSTEP is the only steamer on the river; she draws 4½ feet and can push a 300-ton barge upstream. She averages two trips from Bethel to McGrath during the open season, which extends from about the middle of May to the middle of October. This steamer afforded the first means of taking good astronomical instruments up the river and the usual fair weather afforded opportunity for the first good determination of positions along the river's course. As some previous positions were found as much as 50 miles in error, a new map of the river will fill an urgent need in future developments in this region.

For the first 100 miles the river winds through the low lake country peculiar to the territory east of Bering sea; for the next 200 miles it cuts through mountains where the rapids have a 6 to 8-mile current and the banks, in places, rise over 1,000 feet directly from the water. The upper river flows through an immense basin, over which are scattered solitary peaks and the horizon of which is a ring of distant mountains.

Second only to the Yukon in size, the Kuskokwim is visited yearly by but two or three small steamers, which ascend as far as Bethel; but the recent publication of charts has made it possible safely and confidently to navigate the channel through the vast area of mud flats which lie off the river's mouth, a feat formerly extremely hazardous and requiring sometimes weeks to accomplish. The comparison of present with previous freight rates tells the story of putting the Kuskokwim on the commercial map.

The Eastland Aftermath

In view of the hue and cry raised from innumerable sources at the time of the EASTLAND disaster, and of the evident desire then existing for a victim or "goat", the recent findings of Judge C. W. Sessions, of the federal district court of Michigan, in the case of six men implicated in the disaster, are of unusual interest. The six defendants were George T. Arnold and William T. Hull, president and vice president-general manager of the Michigan corporation which owned EASTLAND; Robert Reid and Charles C. Eckliff, local federal inspectors of steamboats for the district of Michigan; and Harry Pederson and Joseph M. Erickson, captain and engineer of the vessel.

Excerpts from the court's findings after disposing of several charges on technical grounds, are as follows:

"For 12 years this vessel had been navigating the Great Lakes in the excursion trade and had carried hundreds of thousands of people. During all that time, so far as appears, she had never met with an accident or a mishap which resulted in injury to or loss of the life of any person. During the first three seasons of her career she was licensed and permitted to carry from 2,800 to 3,300 passengers and upon several occasions was loaded to her limit. In later seasons she was authorized to carry from 1,200 to 2,200 people, the number depending upon the condition and quan-

tity of her life saving equipment. Her water ballast system and apparatus had not been changed since she was built, and, unless defective in original design and construction, was in perfect working condition. Under these circumstances, no one can say that the owners, managers, navigators and official inspectors of this steamer were not justified in believing that she was seaworthy.

Ridicules Conspiracy Charge

"Each of the remaining counts of the indictments charges a criminal conspiracy. Little need be said upon this subject. There is no proof which tends, even in slight degree, to fasten such guilt upon any of the respondents. A conspiracy is a combination or agreement to do an unlawful act or to do a lawful act by unlawful means. In either case a wicked combination is the essence of the crime. An agreement to be criminally negligent can scarcely be imagined. A combination of these defendants to destroy human life is both unbelievable and unthinkable. A conspiracy to commit an impossible crime is itself an impossibility. Every act charged and proved against these respondents was done in the usual and ordinary course of business and is more consistent with innocence than with guilt. Many of them were required by law. None of them is shown to be otherwise than innocent. All of them considered together utterly fail to show a meeting of corrupt minds to accomplish an unlawful purpose.

"The dead cannot be restored to life. The sorrow of the living cannot be lessened by claiming other victims. The majesty of the law cannot be upheld and vindicated by forcing men from their homes to stand trial among strangers upon accusations which there is barely a scintilla of proof to sustain. The evidence in this matter wholly fails to establish probable cause for believing any of these defendants guilty of any crime charged in the indictments. The application for a warrant of removal will be denied."

Sturdy Great Lakes Package Freighter Built to Buck Ice

NEVADA, newest of the Goodrich Transit Co.'s fleet, has been placed in package freight service between Chicago, her home port, and Milwaukee. In addition to her regular work, NEVADA is designed for use as an ice-breaker and wrecking ship. A general description of the steamer, which was recently completed at the yards of the Manitowoc Ship Building & Dry Dock Co., Manitowoc, Wis., was presented in *The Marine Review* of June, 1915, dimensions and construction data being taken up in detail. The accompanying initial illustration shows the fine lines of NEVADA's bow, which aid her in breaking through ice fields. A water bottom five feet in depth is provided, for the double purpose of lending stability and weight in attacking heavy ice, and assisting in wrecking operations, by giving a tremendous lifting impulse as the bottom is pumped free of water. The vessel's bows are built particularly strong, in order to withstand the severe usage encountered while clearing thick ice. Steel plates ¾-inch to 1 inch thick are used on the bows and a 30-inch plate stringer is carried just below the waterline, while a 6-foot waterline strake, 1 inch thick, along the entire length of the hull, prevents pressure damage to the plates. Although NEVADA's original design called for seven watertight compartments, the vessel was completed with nine, said to be more than are employed in any other craft on the lakes. This construction adds stiffness to the hull, giving a greater margin of safety. As an additional aid in wrecking operation, a derrick boom, 40 feet long, with a capacity of 5 tons, is provided on the main mast. This boom is to be used in handling heavy freight packages that cannot be taken into the hold. Three turbine generators supply cooking and lighting current.

Forbid Sale of Ships

E. T. Chamberlain, commissioner of navigation, recently issued the following notice relative to the purchase of foreign merchant ships:

"In the past 11 months, leading maritime nations possessing over three-fourths of the world's merchant shipping under foreign flags, have passed laws or issued decrees, forbidding their citizens or subjects to sell and transfer to the flag of another nation any merchant ship under their respective flags except by a special permit from the government. Great Britain enacted such a law on Feb. 12; Austria-Hungary issued such a decree on Aug. 27; Denmark on Oct. 8; Germany enacted such a law on Oct. 21, France on Nov. 11, Norway issued a decree on Dec. 6, Brazil on Dec. 9, and Spain promulgated a law on Jan. 9, 1916. The merchant shipping of these countries aggregates 33,900,000 gross tons out of a total of 43,370,000 gross tons of all foreign nations. Other nations may promulgate similar laws or decrees for the duration of the war, and notice of such laws or decrees may not be received in this country until after they have taken effect.

The bureau of navigation suggests that prospective American purchasers of ships under foreign flags, with a view to American registry, will consult their own interest in a clear title if in all cases they acquaint themselves with the transfer law of the nation whose flag the ship, proposed to be bought, now flies.

New Patents

Copies of any one of these patents can be obtained by sending fifteen cents in stamps to Siggers & Siggers, patent lawyers, Suite No. 11, National Union building, Washington, D. C., if *The Marine Review* is mentioned.

1,170,529.—Submarine Boat. Hugo E. Grieshaber, New London, Conn., assignor to Electric Boat Co., New York, N. Y., a corporation of New Jersey.

1,170,900.—Internal combustion engine of the two-cycle type. Sherren Bruce Douglas Harding, London, England.

1,171,060.—Folding oak-lock. Frederick C. Miller, Hillsboro, Ore.

1,171,153.—Mine and torpedo guard. Joseph A. Steinmetz, Philadelphia, Pa.

Why Japs Make Money

ACCORDING to the Japanese government's regulations for marine subsidy, 50 sen ($0.249) is to be granted to a ship, not more than five years old, per gross ton for every 1,000 miles at 12 knots per hour, plus a 10 per cent increase for each knot per hour faster than 12, plus a 25 per cent increase for vessels which have been built according to plans approved by the government. Five per cent is to be deducted for each year of the ship's age in excess of five.

The government will grant a subsidy to the Toyo Kisen Kaisha for three vessels, namely TENYO MARU, CHIYO MARU and SHINYO MARU, of about 13,000 gross tons each; to the Osaka Shosen Kaisha for four vessels, namely, CHICAGO MARU, PANAMA MARU, CANADA MARU, each of 6,000 tons, and HAWAII MARU of 7,000 tons; to the Nippon Yusen Kaisha for two vessels, SHIDZUOKA MARU and YOKOHAMA MARU, each of 6,000 tons.

Under the regulations the Toyo Kisen Kaisha will receive in 1916 for the ships mentioned, approximately 1,635,000 yen ($815,240), the Osaka Kaisha Shosen 1,004,000 yen ($499,992), and the Nippon Yusen Kaisha the balance (the total subsidy for North America being 2,949,012 yen—$1,468,608—for the year 1916) or 310,012 yen, equivalent to $154,386.

Examination of the papers of the Pacific Mail steamship KOREA shows a monthly salary expenditure of about $5,000, while the average monthly expenditure for salaries on a Toyo Kisen Kaisha steamer does not exceed $3,000. If anything this is too high an estimate.

KOREA may be taken as an average vessel, since the Pacific Mail fleet consisted of two vessels of the size of KOREA, two larger ships, and only one smaller one. Taking into account the subsidy which the Toyo Kisen Kaisha receives, it costs this company about $227,860 less per year to run one ship of its fleet of four than it did the Pacific Mail Steamship Co. to run one of its five ships.

The difference in the salaries paid on the Toyo Kisen Kaisha steamships and those on the Pacific Mail vessels lies in the above, as the salaries paid to Japanese and Chinese members of the crew would not differ to any extent. The wages to the Asiatic crew, in Hongkong currency, amount to $4,092, of which the principal items are as illustrated in the accompanying table.

Wages of Oriental Crew

Positions.	Monthly pay.	Positions.	Monthly pay.	Positions.	Monthly pay.
Carpenter's mate.	$25.00	Two saloon cooks, at $35	$70.00	Four mess boys, at $12	$48.00
No. 1 boatswain.	30.00	Three saloon cooks, at $15..	45.00	Six "learn" boys, at $0.25	1.50
No. 2 boatswain.	25.00	Baker	45.00	Five bath boys, at $15	75.00
Seaman	20.00	Two bakers, at $15.	30.00	Two deck boys, at $15	30.00
33 seamen, at $15	495.00	Baker	.25	Steerage cook	35.00
Sailmaker	12.00	Butcher	15.00	Two steerage cooks, at $15..	30.00
Two mess boys, at $0.25	.50	Porter	20.00	Five steerage waiters, at $15.	75.00
Mess boy	18.00	Porter	.25	Japanese steerage cook	25.00
18 oilers, at $18..	324.00	Pantryman	20.00	Two Japanese steerage cooks, at $15	30.00
Fireman	23.00	Five pantrymen, at $15	75.00	Check clerk	30.00
Fireman	20.00	Scullery man	15.00	Chinese instructor	75.00
Fireman	18.00	Silver man	15.00	Two Chinese instructors, at $55	110.00
39 firemen, at $16	624.00	Printer	30.00		
45 coal passers, at $14	630.00	Interpreter	40.00		
Storekeeper	18.00	Barkeeper	30.00		
Two mess boys, at $12	24.00	No. 1 cab. waiter	25.00		
Two mess boys, at $0.25	.50	38 cabin waiters, at $15	570.00		
Saloon cook	45.00	Two mess boys, at $15	30.00		

A Lesson in Patriotism

As told in a recent issue of *The Marine Review*, the frigate PORTSMOUTH, one of the last survivors of the wooden navy, has been condemned at the Norfolk navy yard and sold for $3,662—about what the metal in her stout hull will bring, and has disappeared under the axe of the ship-breaker or the torch of the dealer in junk, and human vultures at last have picked her old frames. There are those impractical persons who say that it is sacrilege.

PORTSMOUTH'S sister ships, JAMESTOWN and ST. MARY'S have recently suffered the same ignominious fate that is in store for her; so have ALLIANCE, ENTERPRISE, INDEPENDENCE, NIPSIC, OMAHA, SARATOGA, WABASH and others—all grand old patriarchs, which have played a large part in the preservation of the nation. Of the few remaining, such as the noble HARTFORD, LANCASTER and ESSEX, their imminent destiny is likewise to be condemned by that grim executioner, the board of estimate and survey, and sold for an amount less than the cost of firing a superdreadnaught's big gun!

Worth one gunshot in cold cash, but untold riches in memories, these gallant veterans deserve a better fate. In this utilitarian age on lacks the presumption to suggest that they be restored. But Uncle Sam might profitably learn a little lesson in patriotism from one of his diminutive neighbors overseas—might have learned it some years ago, in fact, and saved himself the charge of being a vassal of Mammon.

When the training ship THERMOPYLAE of the Portuguese navy recently got too old for further service, it was decided to give her a naval funeral rather than sell her. So she was towed to sea and sunk—sunk, too, by men who probably had never heard or thrilled to the verse:

> Nail to the mast her holy flag,
> Set every threadbare sail!
> And give her to the god of storms,
> The lightning and the gale!

Submarine is Junk

An acetylene torch changed the old Holland "9," which was the first practical undersea war craft, into a mass of twisted junk recently at Port Richmond, N. Y. She was then taken to the scrap yards of the Henry A. Hitner's Sons Co., Huntingdon street and Aramingo avenue, where she lost her identity among piles of other junk.

The "9" was the last of a series of experiments conducted by John P. Holland and Samuel Lobe, and proved successful. She was finished in 1900, and was bought by the government for $150,000 and two years ago was sent to the scrap pile and sold for $1,076.50 to the Hitner firm.

Like all inventions various mishaps and disappointments marked the progress toward success. The first, built in 1875, was so imperfect that it was feared she would sink never to rise, again, if tried out. The second was no better, while the third never got beyond a certain stage and was left unfinished. The fourth and fifth met misfortune in the water; the sixth was in theory only, and the seventh, though accepted by the government, was later abandoned. The eighth was evolved into the ninth and undersea warfare became assured.

Maynard D. Church has been appointed chief engineer of the Terry Steam Turbine Co., Hartford, Conn. The Terry company builds steam turbines adapted for a wide variety of uses.

Fig. 1—Lock and Dam No. 2 on Ohio river

River Traffic Awaits Improvements

Present Movement of Four Million Tons Annually Will Double When Dams Are Finished — How Coal Fleets Are Handled

By C. F. Williams

TRAFFIC on the Ohio river will not increase greatly in volume until the government has completed the slack water system of navigation between Pittsburgh and Cairo, Ill. The work of creating this system began many years ago, but it may be another decade before it is finished. In the meantime, freight agents for river transportation companies will continue to solicit business on a somewhat uncertain basis, because of their inability to always make definite promises of deliveries.

Ohio river steamship companies cannot operate on regular schedules until engineers in charge of river improvements control the depth of the river channel at all times. They will be able to do this upon the completion of 53 locks and movable dams between Pittsburgh and Cairo, a distance of approximately 965 miles. Since the advent of steam propelled craft, traffic between these two points has been controlled entirely by the amount of rain that falls on the water sheds of the Ohio and its principal tributaries, the Monongahela and Allegheny rivers. Obviously, shipping schedules on the Ohio river necessarily are elastic and subject to sudden changes. It is now impossible to promise deliveries, because of the irregularity and uncertainty of shipping stages.

Project Twoscore Years Old

The original project for lock and dam construction on the Ohio river was suggested in 1875 and work on dam No. 1, near Davis Island, Pittsburgh, commenced a couple of years later. Plans for the present undertaking, involving the construction of 53 locks and dams to provide a permanent slack water system, were proposed in 1890. Originally it was believed a depth of six feet would be sufficient, but as traffic became heavier it was decided to secure a depth of nine feet. The undertaking of the government is a tremendous one. Total expenditures for slack water prior to June 30, 1914, amounted to more than $24,000,000.

The most recent data offered by the government corps of engineers in charge of the improvements show that 14 dams were completed and in operation on Nov. 6, 1914. A total of 23 dams will be in operation the early part of next year and an additional dam will be completed before Jan. 1, 1917, if present plans carry. Engineers propose to complete five dams in 1917 and two dams in 1918.

Two other dams have also been authorized, but contracts have not been let for either. Sites have been determined for the remaining 20 dams, but the government has not yet authorized their construction. It has been decided to eliminate dam No. 42 and this may change the location of dam No. 43,

FIG. 2—COAL FLEET IN PITTSBURGH HARBOR, SHOWING STERNWHEEL TOWBOATS

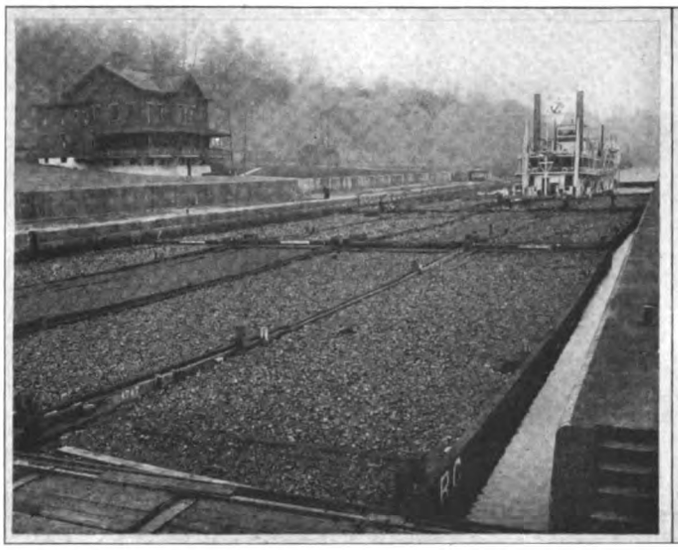


FIG. 3—PORTION OF A COAL FLEET LOCKING DOWN RIVER

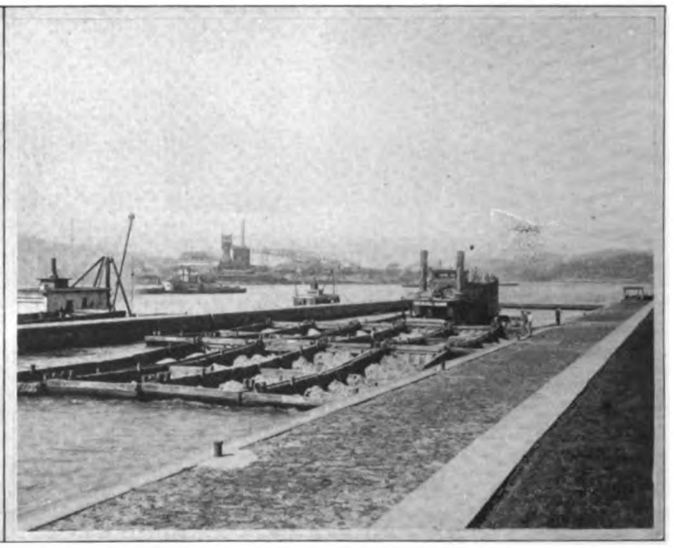


FIG. 4—IMPROVEMENTS ON OHIO RIVER AT LOCK NO. 1 NEAR PITTSBURGH

which will be completed in 1918. How much time will be required to finish the slack water system, is unknown. Construction work thus far has been slow—much slower than expected. Generally, construction work ceases when rises occur in the river; operations are suspended during the winter months and numerous setbacks are caused by floods, abnormal freshets, ice, etc. Although shipping interests blame the government for these delays, yet most of them seem unavoidable, so far as government engineers in charge of the work are concerned.

Most of the dams in operation are composed of Chanoine wickets in their navigable passes and are equipped with pool regulating weirs, with gates of the bear trap type. The length of wickets vary between 9 feet 9 inches for the lowest weirs and 18 feet for the highest passes, according to a report by J. W. Arras, assistant engineer in charge of improvement work. Navigable passes vary in width from 600 to 700 feet and bear trap gates are from 91 feet to 94 feet wide. The approximate dimensions of the locks between the gates are 110 x 600 feet. The locks are equipped with the rolling type of gate, which is of steel construction, and are usually filled through 16 cast iron butterfly valves, 4 feet 6 inches in diameter, in the river wall above the dam being emptied through the same number of valves of similar type in that wall below the dam. Locks are operated by compressed air. Each lock is provided with a duplicate power plant to prevent delay to navigation in the event of a machinery breakdown. In operating and maintaing locks and dams, engineers have had to contend with fluctuations in the river, drift, ice, breakages and renewals, all of which have tended to retard the progress of the work and to temporarily reduce the efficiency of the slack water system.

Ohio river shipping interests at Pittsburgh express confidence that river traffic will double in volume shortly after the slack water system of navigation is completed. This means that shipments through lock and dam No. 1 at Pittsburgh will jump to about 7,000,000 net tons annually, since the average annual tonnage through this lock for the 6-year period, ending Dec. 31, 1914, was 3,609,152 tons. Tonnage figures for the years 1909 to 1914, inclusive, which show the volume of Ohio river traffic in a

FIG. 5—COAL FLEET TIED UP IN STREAM AT PITTSBURGH

representative manner, as it is estimated at dam No. 1, follows:

Year.	Tons.
1914	3,420,239
1913	4,033,685
1912	3,133,159
1911	4,105,649
1910	3,140,533
1909	3,821,647

Calculations of the volume of traffic through lock and dam No. 1 in 1913 and 1914 indicate that more than 50 per cent of the tonnage consists of coal. Of the total of 21,654,912 tons for the 6-year period, 13,629,260 tons were shipped by coal interests operating mines along the Monogahela and Allegheny rivers. The remaining 8,025,652 tons consisted of iron and steel products, sand, gravel, lumber and miscellaneous commodities, manufactured in the Pittsburgh district.

Up to a quarter of a century ago, Pittsburgh district coal, or "river" coal, as it is better known, was used almost exclusively by manufacturers having plants along the Ohio and Mississippi rivers, and heavy tonnages were shipped to New Orleans for steamship companies. During the last 25 years, however, other districts have become rather prominent factors in the coal markets along the lower Ohio and Mississippi rivers; railroads also have succeeded in building a profitable business through their ability to promise reasonably prompt and regular deliveries to the southwest. Ohio river shipping interests hope to regain what tonnage they have lost to the railroads just as soon as they are in a position to operate their coal fleets at regular intervals.

The Pittsburgh Coal Co., Pittsburgh, is the principal merchant shipper of coal on the Ohio river. The company owns most of the gas and steam coal areas on both sides of the Monongahela river above Pittsburgh. Approximately 50 mines are operated and all of these have river tipples. The Pittsburgh company maintains a river fleet of 3,500 barges and coal boats and about 80 steamships and tugs. Barges and coal boats of wooden construction now are in use, but the company plans to employ modern steel vessels as soon as river improvements have been completed.

The coal barges and boats are mechanically loaded at the tipples, after which they are assembled and locked in the Pittsburgh harbor, where they await a sufficient stage for shipment down the river. The coal is screened before it is emptied into the barges, which are loaded to the top gunwale. Coal fleets as they are made up at Pittsburgh usually consist of 17 boats, each having a capacity of 1,000 tons. The average fleet is 130 feet wide and 700 feet long and is propelled by a stern wheel steamboat. The Pittsburgh company operates coal mines in Kentucky, which enables it to increase the size of its fleets at Louisville, one of the principal assembling points on the river. The average fleet operating below Louisville, consists of from 25 to 46 barges, having a capacity of 1,000 tons each.

It takes 18 days for a coal fleet to make the trip from Pittsburgh to New Orleans, six days from Pittsburgh to Louisville and five days from Pittsburgh to Cincinnati. The completion of the slack water system between Pittsburgh and Cairo will enable carriers to reduce the schedule to these points, thereby increasing the number of shipments proportionately. Furthermore, overhead charges of river steamship companies will be decreased materially, since their equipment will not stand idle during indefinite periods of drought. The Pittsburgh harbor ofttimes is literally bottled up by coal fleets awaiting the necessary 9-foot stage to start down the river.

The Pittsburgh company maintains complete pumping and caulking equipment at all anchorage points and operates an extensive marine shop at Ninth street, Pittsburgh. Marine ways are owned at Elizabeth, Pa., and a sawmill and repair shop at Monongahela City, Pa.

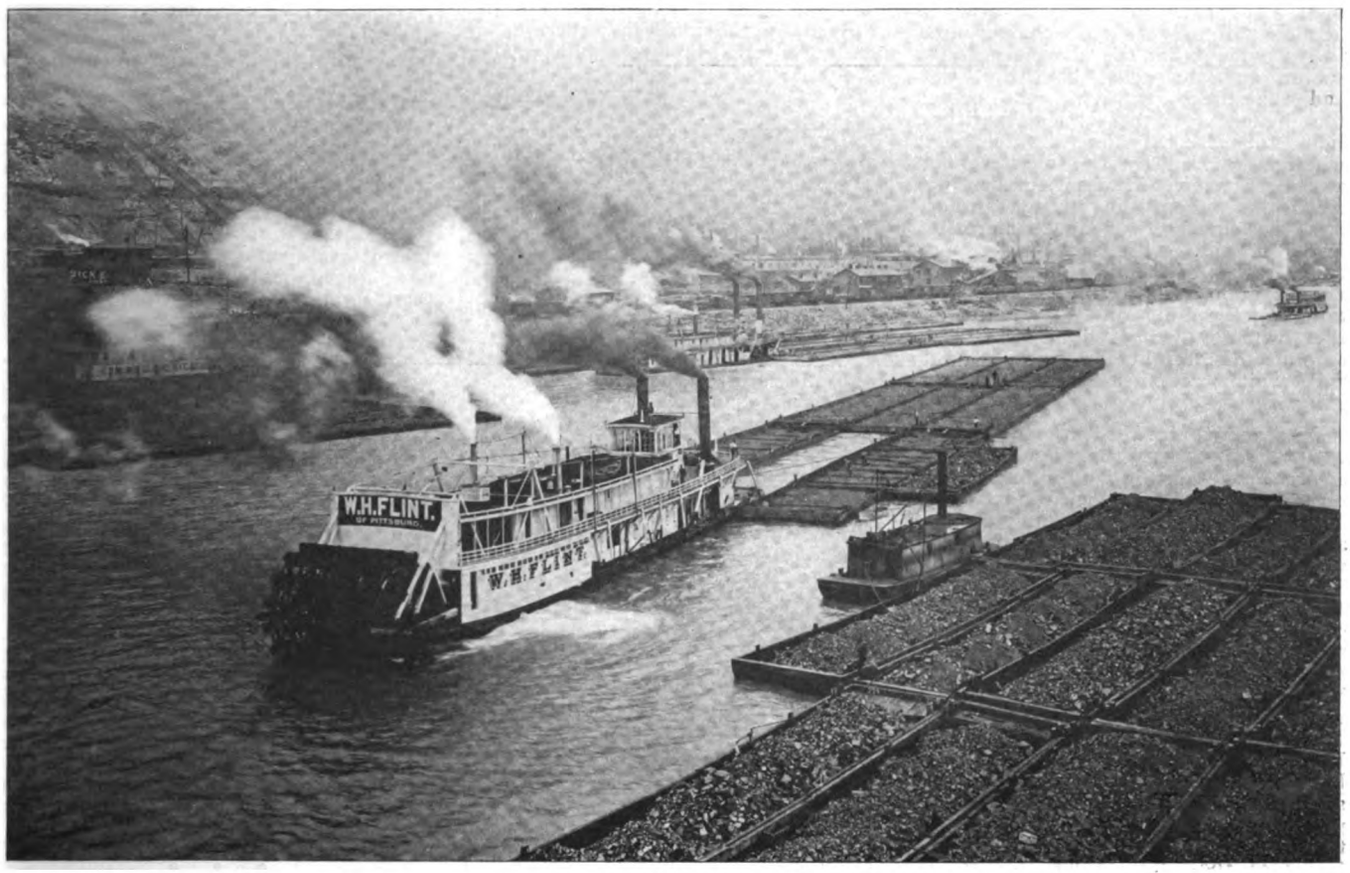


FIG. 6—STEAMER W. H. FLINT WITH TOW OF COAL BARGES, SHOWING METHOD OF LASHING BARGES IN FRONT OF STEAMER

Late Decisions in Maritime Law

Legal Tips For Ship Owners and Officers

Specially Compiled for The Marine Review

By Harry Bowne Skillman

Attorney at Law

A SHIP has a lien on the cargo rightfully on board for the freight or carriage. This is so, it was decided in JEBSEN v. Cargo of Hemp, 228 Federal Reporter 143, whether the ship is under charter or not, and without regard to whether the owner or charterer is entitled to the lien. The charter here gave the owner a lien on "all cargoes" for charter hire, and provided that the charterer might sublet, and the court held that this had the effect of giving the owner the benefit of the ship's maritime lien for freight on all cargoes, whether carried by the charterer or a subcharterer. It was further decided that where the charter authorizes the charterer or subcharterer to load the ship with such cargoes at such rates of freight as may be agreed upon, and to require the captain to sign bills of lading therefor, the owner's lien is limited to the amount of freight so agreed upon and which remains unpaid by the shipper.

* * *

It appeared in the case of NESHAMINY, 228 Federal Reporter 285, that a fire broke out in an engine house on a floating dry dock and within 10 feet of a barge undergoing repairs, and that the dock was beyond the reach of the local fire department. Two tugs, one playing on the fire from the deck of the barge and the other from under the overhang of the engine house, extinguished the fire, the assistance of such tugs not being asked but being accepted and relied on by the barge's master. The barge did not take fire but would have burned had the dock burned. It was held that while the direct service of the tugs was to the dock, which was the only effective service that could be rendered, the direct result of such service was protection to the barge, which was a salvage service, for which compensation should be paid. The same case held that the dock itself was not a subject of salvage service.

* * *

The question whether the statute of the state of Washington, making vessels liable for injuries committed by them to persons or property, within the state, and giving a lien therefor, extends to actions by the heirs or representatives of a decedent for his wrongful death, was in issue in the case of ALASKA, 225 Federal Reporter 645, and it was there held that such statute extends to the injured person only. The court said: "Neither the general admiralty law nor the common law give a right of recovery for the death of another as the result of negligence. No lien is given by admiralty; neither can admiralty create one. While admiralty has jurisdiction of such an action primarily because of the place where the act complained of occurred, the right of a proceeding against the offending thing is a right which is controlled and governed by local law. The right of recovery is therefore predicated upon the local law, and unless a lien is given by the local law there is no lien to enforce by preceeding *in rem* in a court of admiralty."

* * *

A charterer agreeing to return vessel in same condition it was in at time of the charter, except wear and tear, did not insure the vessel against inevitable casualties or losses occurring without fault on his part, it was decided in J. M. Brown, Inc., v. W. P. Fuller & Co., 153 Pacific Reporter, 960, and he was not liable for its becoming wrecked without his fault.

* * *

An alien seaman, having served three years on a merchant ship of the United States after filing of his declaration to become a citizen of the United States, and having produced his certificate of discharge and good conduct during that time, together with certificate of his declaration of intention, is entitled, it was decided in In re Tancrel, 227 Federal Reporter 329, to admission as a citizen without further proof.

* * *

To come within the statute of the state of Washington, giving a lien on vessels for repairs made at the request of the owner, agent, etc., it must appear that the repairs were furnished on the credit of the vessel. The evidence to show this may be slight, and evidence of the repairer that he relied on the credit of the vessel, and that he had previously made repairs for the same owner, charged the same to the vessel direct, and rendered the bills to the owner, was sufficient, according to the decision in the case of ALASKAN, 227 Federal Reporter 594.

* * *

"In a contract of towage," said the court in ENTERPRISE, 228 Federal Reporter 131, "there is an implied obligation that the tug shall be efficient and properly equipped for the service, provided, of course, that the breakdown did not arise from causes which ordinary care could have discovered and prevented." In this case it was held that an inspection of a tug some six months before breaking her rudder, in which the rudder was not properly tested to discover defects in the iron casing, did not relieve the tug from liability for loss of her tow. It was further decided that the tug had the burden of establishing the defense of inevitable accident, to exonerate her from liability.

* * *

"Term 'mean low tide', as applied to Puget Sound, signifies the mean or average level of the low tides, including both the long and the short daily runout. 'Mean lower low tide' signifies the mean level of the daily extreme low tides. 'Harmonic plane' is the zero adopted by the United States coast and geodetic survey of the department of commerce upon which its tidal tables, charts and maps are based. It is an arbitrary plane, and is the lowest plane of the tide in Puget Sound recognized by that department. It is approximately two feet lower than mean lower low tide, and approximately four feet lower than mean low tide."—Supreme Court of Washington, in State v. Scott, 154 Pacific Reporter 165.

* * *

In case of ALCAZAR, 227 Federal Reporter, 633, it was decided that a tug, which at the request of a stranded steamship, stood by for several hours in a heavy sea, taking off the crew because the ship had a list of 45 degrees, and was unmanageable, and which next day, after undertaking to tow the ship to port, took the crew off and conveyed them to port, was entitled to salvage service, though another vessel took the ship in charge meanwhile, as the steamship was in undoubted peril, and the service rendered left her in less dangerous situation, and probably, although not certainly, contributed to her safety. The court held in the same case that a vessel found at sea in a position of danger and without any one of her crew on board of her is *prima facie* a derelict.

* * *

The Supreme Court of the United States held recently, in the case of New Orleans-Belize Royal Mail & Central American Steamship Co., Ltd., v. United States, 36 Supreme Court Reporter 76, that the United States did not become the owner *pro hac vice* of a vessel chartered for military service, under a charter party reciting that the owner "does hereby grant and let" and that a quartermaster of the army "does hereby take" the vessel, so as to affect the extent of the government's liability for injuries to the vessel and for demurrage due to repairs. Other provisions of the charter party fixed a price at which the United States might purchase the vessel, referred to the vessel being returned, gave the government control over the destination, and required the owner to furnish the master and crew and to assume the risk.

Developing Philadelphia's Harbor

Proposed Plans for Deepening River Channels and Building Piers to Handle Water-Borne Traffic at This Port

By Frank P. McKibben

PHILADELPHIA, as Pennsylvania's only seaport, is the state's natural outlet for the surplus of manufactured goods and natural resources. It is the natural gateway through which the manufactured articles and raw materials from foreign countries pass. Consequently, the volume of traffic through Philadelphia should show an increase comparable with the increase of the economic production of Pennsylvania. However, the total production of wealth in Pennsylvania increased 34 per cent in the decade ending in 1910, while the increase in value of exports and imports of foreign commerce at Philadelphia in the same period was only 19 per cent. The net tonnages of combined foreign and domestic commerce of the port in the decade ending 1910 increased only 19 per cent.

The problem of improving the port of Philadelphia is not confined to Philadelphia; the entire state of Pennsylvania is interested. Improvements of water terminals at Philadelphia and Pittsburgh are necessary to continued economic development of the entire state. As an illustration, a well known Portland cement made in the Lehigh valley is selling today in the United States of Colombia at Bogota. Anything the state can do to lessen the cost of transporting this cement will redound to the interests of the cement district and, incidentally, Philadelphia will profit somewhat in the trans-shipment.

The following table indicates clearly that the rate of increase in the shipping at Philadelphia is far below the rate of increase in the economic production of Pennsylvania:

Year.	Total production of wealth in Pennsylvania.	Total Value of exports and imports at Philadelphia.	Net tonnages of foreign and domes. commerce at Philadelphia.
1900	$1,237,123,278	$130,336,969	12,000,576
1910	1,655,179,794	154,867,353	14,264,040
Inc. of 1910 ov. 1900, per cent	34	19	19

Appropriations Inadequate

Now look at the attitude that Pennsylvania took two years ago. An appropriation of a million dollars was sought, to improve the terminal facilities at Philadelphia. Only $250,000 were granted. The sum originally asked for would have been little enough, but to reduce the amount to $250,000 was absurd if a substantial development of the port of Philadelphia is desired. This sum is about one-sixth of the cost of an ordinary pier. If the state maintained appropriations at the same rate as that made in 1913, it would take 12 years to secure enough money to build one pier. At the same rate, 120 years would be required to build the 10 proposed municipal piers on the Delaware river front at South Philadelphia.

The total expenditure of the federal, state and city governments in improving and maintaining the harbor of Philadelphia from 1890 to 1914 amounted to only $17,293,000. This sum does not include the cost of improving the Delaware river from Philadelphia to the sea, which from 1836 to 1913 amounted to $17,523,000. From 1890 to date, the state of Pennsylvania has appropriated $1,525,000 for the improvement of Philadelphia harbor, or enough in a quarter of a century to build one pier. Contrast the above figures with the customs duties collected at Philadelphia in 1913, amounting to $18,875,000 and in 1912, $21,083,000.

Statements are made frequently that investments in steamship lines are not profitable and that a state is not justified in helping the shipping interests. The following table shows dividend payments of some of the prosperous lines. The table speaks for itself. Of the companies mentioned, the United Fruit Co. differs from others in that it

Portions of an article published in The Journal of the Engineers' Society of Pennsylvania. The author, Frank P. McKibben, is professor of civil engineering, Lehigh university.

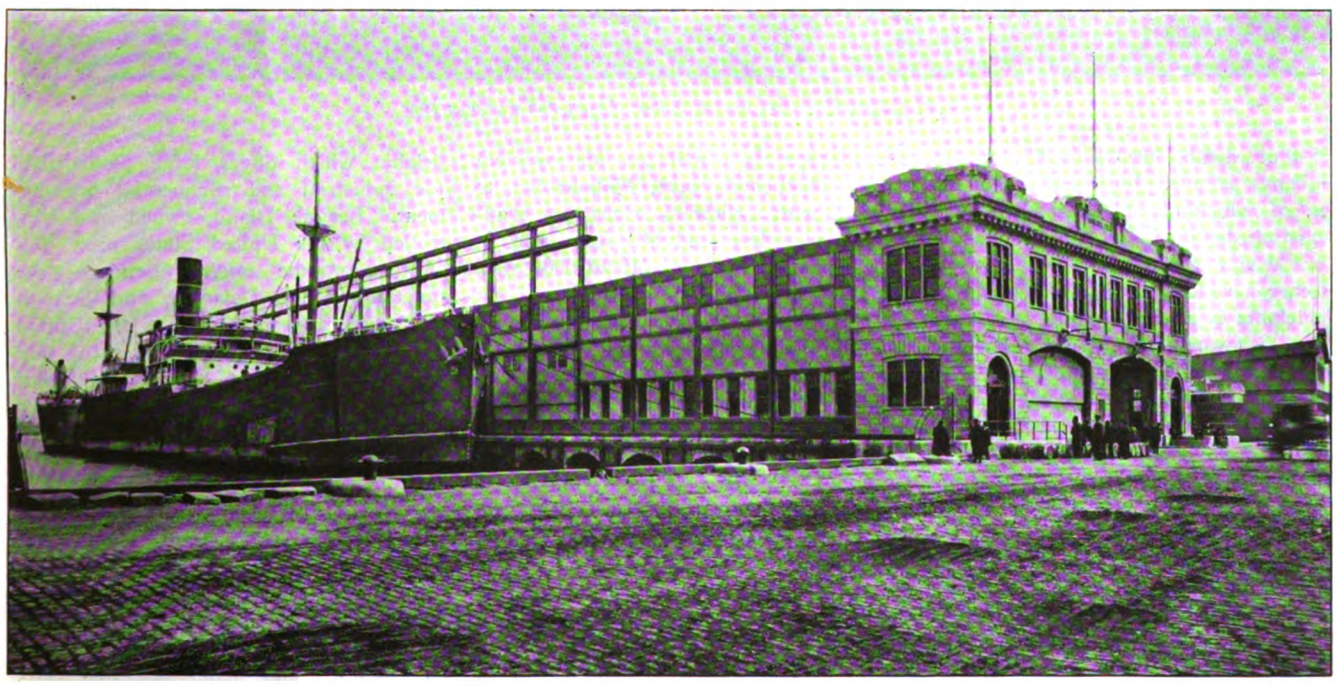


FIG. 1—NEW DOCK STREET PIER, PHILADELPHIA

is engaged not only in the transportation of ocean freight and passengers, but also in selling the fruit carried within its steamers. The table below indicates that investments in conservative and well managed shipping companies are desirable:

Company.	1913. per cent.	1912. per cent.	1911. per cent.	1910. per cent.
Oceanic Stm. Nav. Co. (White Star Line)	65	30	60	30
Ellerman Lines.....	22*	12	13	..
Cunard	10	10	7½	7½
N. German Lloyd...	8	7	5	3
Hamburg American..	10	10	9	8
Holland American...	15	15	12	15
American Hawaiian..	8	8	7	7
United Fruit	10	8	18	18
Peninsula & Oriental Stm. Nav. Co.....	15	13	13	13

*+ 100 per cent bonus.

Philadelphia is distinctly a river port, and an important tidewater railroad and pipe-line terminus. The distance from

In the river and harbor act of 1899, congress adopted the project for a channel having 30 feet minimum depth and 600 feet minimum width from Christian street, Philadelphia, to deep water in Delaware bay. The estimated cost of securing this 30-foot channel was $5,810,000. Thus before the 26-foot channel was completed, the 30-foot channel project was begun. The 30-foot channel was completed in 1911, 12 years after the passage of the act of 1899. It is interesting to notice that the project calling for a 30-foot depth was inaugurated 14 years after the adoption of the project for 26 feet depth.

Ask Further Development

In 1910, just before the 30-foot project was completed, the United States army engineers stated that the "Delaware river is worth the improvement from Allegheny avenue, Philadelphia, to the sea with a view to securing a channel 35 feet deep and 800 feet wide, at an estimated cost of $10,920,000, with $300,000 annually for maintenance." It was doubtful whether the estimated annual maintenance charge would be sufficient.

This work of increasing the depth of the channel to 35 feet is now under way, having been carried on since 1910. It is not expected that the 35-foot channel will be completed before 1920, and it is generally conceded that the annual appropriations are too small to carry on the new work expeditiously and at the same time maintain the existing 30-foot and new 35-foot channels.

The port of Philadelphia, in so far as the customs are concerned, includes the navigable waters of the Delaware and Schuylkill rivers, bordering on Philadelphia. Within the municipal limits of Philadelphia is a total frontage of 33 miles on rivers with a depth of 18 feet and over. The Delaware river frontage is 18.8 miles. North of the city limits, the Delaware is said to have a depth of 15 feet at mean low water for a distance of 15 miles, while on the Schuylkill front a depth of 18 feet obtains on each side for 7.3 miles to Walnut street. The principal part of the Delaware water frontage is included in the eight miles between the Reading terminal at Port Richmond at the northern end of Philadelphia and the Pennsylvania coal terminal at Greenwich Point, near the southerly end of the city.

There is a vast area of unimproved land at the southerly end of Philadelphia which offers large possibilities for industrial and commercial development. League Island, owned and controlled by the United States navy, lies at the extreme southerly end of the junction of the Delaware and Schuylkill rivers, and was ceded to the United States government in 1868 by the city of Philadelphia. It consists of about 900 acres, and the presence of the navy yard is of great value to Philadelphia.

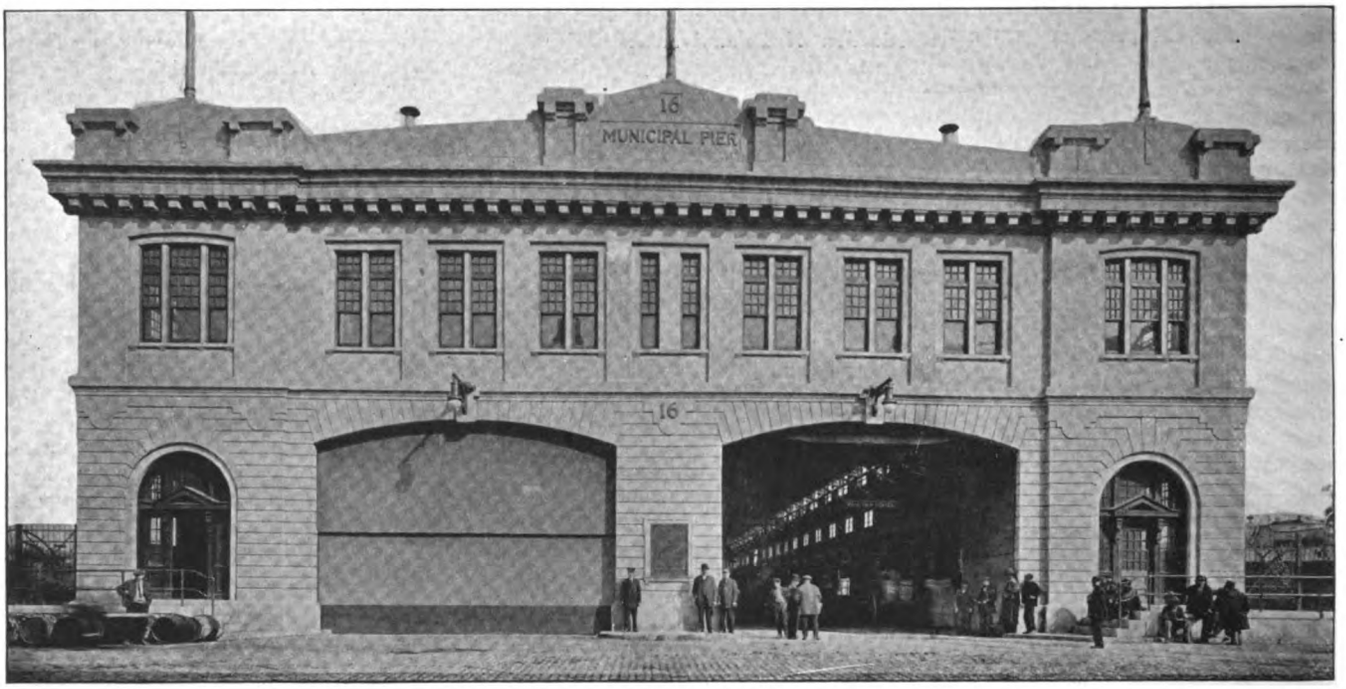


FIG. 2—FRONT VIEW OF NEW DOCK STREET PIER

a 35-foot depth in Delaware bay to Allegheny avenue, Philadelphia, is 63 miles, of which about eight miles have an existing depth of 35 feet at mean low water, leaving 55 miles to be improved to secure a continuous depth of 35 feet. Philadelphia is 86 miles from the capes of the Delaware. The federal government has done a great deal of work in improving the Delaware river, as, originally, obstructions at several places limited the navigable depth to 17 feet to 20 feet between the city and Delaware bay.

Increase Depth of Channel

In 1885 the project of securing 26 feet minimum depth at mean low water, with a minimum width of 600 feet was inaugurated. In 1899 the minimum depths varied from 23 to 26 feet with minimum widths varying from 200 to 600 feet.

Must Have Longer Piers

A study of the shipping facilities on the Delaware water front, shows that before Philadelphia can expect a large increase in its ocean and domestic commerce, it must have larger piers equipped with adequate freight handling devices; an extended and better operated belt-line railway connecting with a greater number of piers than at present; more

FIG. 3—INTERIOR OF NEW PIER

opportunities for the storage of freight cars; more warehouses.

Most of the piers in Philadelphia are small. There are a few fair-sized ones, the largest being about 800 feet in length. The new Dock street pier is only 120 feet wide by 582 feet long, and although only recently completed, it is recognized that a pier of this length is altogether too small. In this particular case, however, the pier could not have been made larger. This illustrates the importance of having the pierhead and bulkhead lines sufficiently far apart to admit of long piers and to admit of extension as future shipping demands it. The department of wharves, docks, and ferries of Philadelphia is alive to the necessity of larger piers and has decided upon piers 250 to 300 feet wide and 900 to 1,200 feet long for the proposed new structures in South Philadelphia.

Warehouses and Railroad Facilities

Large warehouses are necessary if undue delays are to be avoided in holding ships. Loading and unloading ships expeditiously is imperative in view of the rates for charter charges of from $200 to $500 per day. For the same reason, adequate car storage yards are necessary. If a ship is delayed awaiting the shifting of cars during loading or unloading, considerable financial loss may be incurred in the aggregate of a year's business. Assuming that a cargo of 10,000 tons is to be unloaded from a steamer into freight cars and the average load per car is 25 tons, a total of 400 cars would be necessary. These cars should be so placed that they can be quickly and easily put into position to be loaded, and quickly withdrawn from the pier. As about one-half the overseas freight received at Philadelphia passes inland, the importance of several large car storage yards is apparent.

Philadelphia is fairly well equipped with dry docks and marine railways. In or near the city are three dry and three floating docks. In addition six marine railways are available. The two largest docks, however, are in the Philadelphia navy yard, leaving only one commercial dry dock. This has a length of slightly more than 400 feet. The port has need of a larger dry dock and a dock of 1,000 or 1,200-foot length would attract larger steamers to the port, and make ample provision for the future.

The longest dry dock in the United States in 1912 was 804 feet, located at Newport News, Va. There is no dry dock on the Atlantic seaboard capable of docking the large transatlantic liners. In 1912, there were 37 steamers running regularly to New York too large to be dry-docked in that port; moreover, 89 steamers could not be docked in any commercial dry dock there. Nineteen of those vessels found it impossible to be dry-docked in the United States at all. Since 1912, several other vessels have been put into service which cannot be dry-docked in the United States. About once in nine months, a steel vessel is put in dry dock for cleaning, painting, examination and repairs, and no doubt larger ships would be attracted to the port of Philadelphia by the presence of adequate docking facilities.

South Philadelphia Improvements

The city of Philadelphia and its railway systems have attacked, on a comprehensive scale, the problem of re-arranging the great area at the southerly end of the city lying between the Schuylkill and Delaware rivers. Briefly, the im-

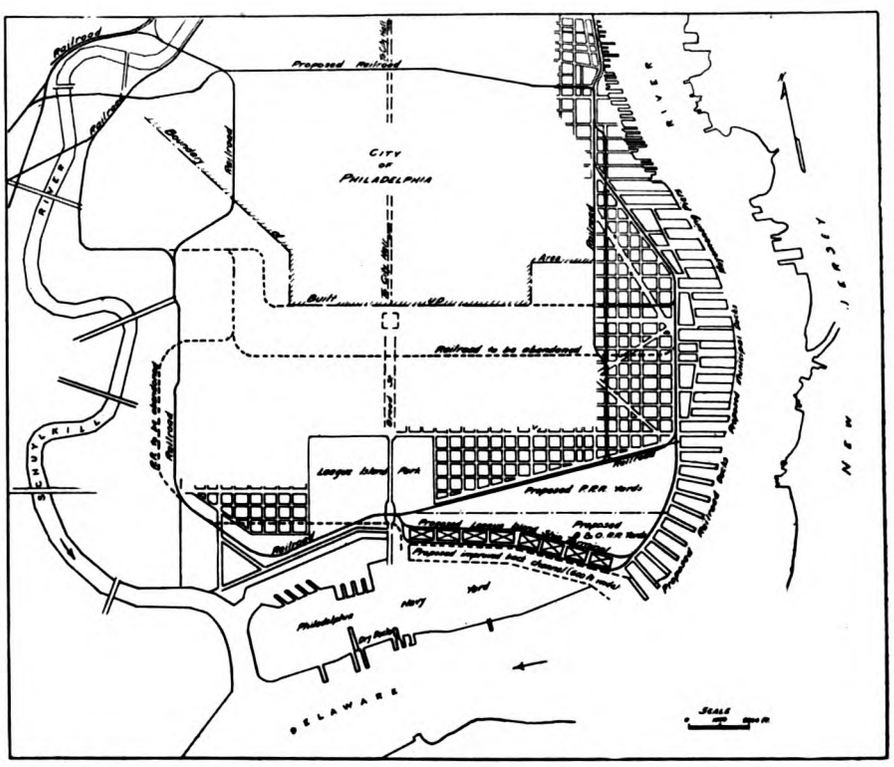


FIG. 4—PROPOSED DEVELOPMENT OF PHILADELPHIA HARBOR

provements call for the elimination of practically all grade crossings, the rearrangement of the railway line down the Schuylkill, thence easterly and up the Delaware; the construction of 10 municipal piers on the Delaware front; the building of large terminal railway yards for the Pensylvania and the Baltimore & Ohio railroads at the extreme lower end of the city opposite the easterly end of League Island, together with a larger number of first-class railroad docks; the dredging of a proposed channel 600 feet wide in the present back channel north of the easterly end of League Island; the construction of steamship terminals on this proposed channel. These improvements are indicated in Fig. 4. The ordinance covering the South Philadelphia improvement was passed Feb. 14, 1914, and general plans were approved by the public service commission June 2, 1914. The city and railroad companies have appropriated a portion of the funds needed and actual construction has begun along the Delaware river.

Ten Municipal Piers

The Moyamensing improvement is a very important feature of the proposed scheme. This consists of the construction of 10 municipal piers, costing about $1,500,000, each, the smallest of which will be 250 x 900 feet. Each pier will be provided with railway tracks running its whole length. Ample car storage space is an important feature in connection with each pier.

Merchandise coming to Philadelphia in ships may be destined; first, for the "hinterland"—that is to points within Pennsylvania or to points inland beyond Pennsylvania. In such a case Philadelphia receives some benefit from the trans-shipment; but such a commercial operation, while it is beneficial to the city in many ways, is not so remunerative as the second class of merchandise, namely, that which is imported into Philadelphia for the purpose of manufacturing, therein. It has been responsibly stated that "seaport communities derive benefits from shipping handled by them amounting on an average to 95 cents per ton of freight."

The port and terminal charges levied upon vessels are very considerable in the aggregate and such charges are, for the most part, legitimate taxes on transportation. An idea of their magnitude may be secured by studying the following tables, showing charges of $2,583.30 incurred by one outbound steamer from Philadelphia and also charges of $3,352.27 paid by another steamer unloading sugar at Philadelphia from Java and then proceeding outward in ballast. These tables are from "Ocean and Inland Water Transportation," by Emory R. Johnson.

The port and terminal charges incurred by a steamer outbound from Philadelphia for Japan, with 166,594 cases refined petroleum, 2,768 tons net register, 4,232 tons gross register, are:

Boatman running lines	$6.00
Towage in harbor	90.00
Electric lights	47.90
Wharfage, 15 days, at $13.50 per day	202.50
Lumber and wood	590.00
Stevedore, loading, 166,594 cases, at 3-4 cent	1,249.46
Winchmen, 296 hours, at 35 cts.	103.60
Custom house clearance	2.70
Custom-house brokerage	2.50
Consul fees	20.00
Attendance fee	51.14
Towage to ocean	90.00
Outward pilotage, 25½ feet at $5	127.50
Total	$2,583.30

The port and terminal charges incurred by a steamer inbound at Philadelphia from Java, with 7,962 tons sugar, and outbound in ballast, 3,923 tons net register, 6,057 tons gross register, are:

Tonnage tax, 3,923 tons at 6 cts.	$235.38
Entrance surveys	5.50
Health fees	10.00
Noting protest	1.50
Custom-house brokerage	2.50
Inward pilotage, 26 feet, at $5	130.00
Tug boats for inward docking	30.00
Boatman running lines	6.00
Survey on hatches and cargo	13.00
Copy surveyor's report	1.75
Custom-house permit, certificate of weights, etc.	1.00
Wharfage, 10 days, at $31.92	319.20
Cooperage, 7,962 tons, at 2 cents	159.24
Stevedore, discharging, 7,962 tons, at 28 cents	2,229.36
Tally-clerks, 11¼ days, at $3	34.50
Custom-house clearance	2.95
Custom-house brokerage	2.50
Consul fees	4.25
Attendance fee	51.14
Towage to stream	30.00
Outward pilotage, 16½ feet, at $5	82.50
Total	$3,352.27

In Philadelphia the entire water front is largely owned and controlled by corporations and individuals. In 1910 the ownership of the Delaware river frontage in Philadelphia was as follows: Railroads 37 per cent; individuals about 55 per cent; the city less than 8 per cent, as follows:

	Feet.
City of Philadelphia	4,431
Pennsylvania railroad	10,591
Philadelphia & Reading railroad	8,416
Baltimore & Ohio railroad	1,750
Lehigh Valley railroad	285
All others	31,166
Total	56,639

Philadelphia's Belt Line Railroad

Philadelphia is to be congratulated for holding on to its belt line railroad, which was incorporated about 25 years ago to permit all railroads entering the city to reach the water fronts on the Delaware and Schuylkill rivers. In order to prevent any railroad obtaining absolute control of it, 51 per cent of the stock is held by the Philadelphia Board of Trade and the Commercial Exchange of Philadelphia. It was not intended that the company should construct or operate railway lines but that any railroad could reach the water fronts by constructing lines under the Belt Line railroad's rights and franchises. Two railroads, the Philadelphia & Reading and the Baltimore & Ohio have constructed short lines which they operate under Belt Line regulations. In the proposed South Philadelphia improvements the Belt Line railroad plays an important part.

The following table shows the arrival of vessels at Philadelphia during the years 1912 and 1913:

	—1912.—		—1913.—	
Vessels.	No.	Tonnage.	No.	Tonnage.
Foreign	1,332	4,963,435	1,336	4,976,353
Coastwise.	4,327	5,047,705	4,572	5,382,036
Totals	5,659	10,011,140	5,908	10,358,389

Philadelphia ranks fifth among Atlantic and gulf ports in the value of exports and imports of merchandise, but it ranks second in tonnage. The net tonnages of foreign and domestic commerce for the port of Philadelphia from the years 1900 to 1913, inclusive, are as follows:

Year.	Arrivals.	Clearances.	Totals.
1900	6,901,201	5,909,375	12,000,576
1901	5,859,106	5,830,164	11,689,270
1902	5,409,779	5,447,468	10,857,247
1903	5,955,648	5,249,618	12,195,266
1904	5,464,142	5,434,237	10,898,379
1905	6,165,713	5,261,754	12,427,467
1906	6,401,189	6,370,985	12,163,409
1907	.....	.....	.....
1908	6,808,334	6,510,106	13,318,440
1909	7,134,012	7,385,930	14,520,942
1910	7,215,479	7,048,561	14,264,040
1911	7,459,691	7,567,982	15,027,673
1912	7,171,942	7,160,517	14,332,459
1913	7,517,503	7,611,444	15,128,947
Average	.....	.....	12,971,120

Will Supervise Pacific Mail

Charles A. Stone, president of the American International Corporation, has announced the election of George J. Baldwin as a vice president of the corporation. Mr. Baldwin will supervise the development of the corporation's shipping business, in which it is greatly interested. At the last meeting of the board the following special committee on shipping was appointed: W. L. Saunders, James J. Hill, J. P. Grace, John D. Ryan and Robert Dollar.

"The American International Corporation," said President Stone recently, "is slowly developing for doing business with foreign countries, and during the past month has made some important steps. At a meeting of the directors, George J. Baldwin, Savannah, Ga., was elected vice president of the corporation, and started immediately for San Francisco to look into the affairs of the Pacific Mail Steamship Co. Mr. Baldwin has now returned and reported to the board the condition of this business and the possibilities for further development of the shipping business, both coastwise and transpacific. Mr. Baldwin will be the representative of the corporation to devote his time specially to this matter, and will be the officer of the American International Corporation who, in association with one of the officers of Messrs. W. R. Grace & Co., will especially follow the affairs of the Pacific Mail Steamship Co."

Astoria Builds New Dock

By F. W. Haskell

ASTORIA, Ore., offers its new public docks as a substantial argument in favor of a common point rate from eastern points to the mouth of the Columbia river. The docks have 5,500 feet of water front, and are said to possess more berthing capacity than any others on the Pacific coast. Their general plan and cross section are shown in the accompanying illustration. On slip 1 are placed the tracks and sheds for handling and storage of freight. By substantial fireproof construction, insurance rates on commodities stored on the docks have been reduced to a minimum. Plans are completed for coal bunkers on slip 2, with a handling capacity of 20,000 tons.

Distribute Dock Charts

Not content to build docks and then wait lethargically for business, the Astoria port commissioners are widely distributing charts, which show the location and character of the docks and mention the following advantages: 5,500 feet frontage, 20,000-ton capacity coal handling equipment; on main channel of the Columbia river; only 8 miles from Pacific ocean; masonry walls, slow burning construction; complete fire protection equipment; low insurance rate; efficient freight handling facilities; four acres of enclosed freight shed floor space.

When the interstate commerce commission was first petitioned to enforce a rate to the ports at the mouth of the Columbia river on a parity with Puget sound, one of the answers was that no freight handling facilities had been provided. The answer is now challenged, not only by the Astoria public docks, but by the Hill steamship docks at Flavel, Ore.

It is said that the ruling of the interstate commerce commission on the renewed petition for a common point rate will soon be announced and that it will be favorable.

Richardson Men Promoted

Captain W. C. Richardson in adding six steel steamers to his fleet on the Great Lakes, now has ten first class modern steel boats. Adding the new boats caused some shifts in the masters and engineers in the way of promotion, also in the hiring of an outside man, Capt. Thomas Simmons, who has been master of the steamer E. L. WALLACE for the past two years. Captain Babbitt goes from HOWARD HANNA to WILLIAM LIVINGSTONE, and Capt. H. S. Lyons from HUBBARD to GOULDER, and Capt. Call from NORTON to the HOWARD M. HANNA JR. and Capt. Gentz from JOHN OWEN to the steamer DAVID Z. NORTON.

The names of two of the steamers that Capt. Richardson purchased have been changed, steamer NORMANIA to steamer WILLIAM F. STIFEL, and WAINWRIGHT to W. C. RICHARDSON.

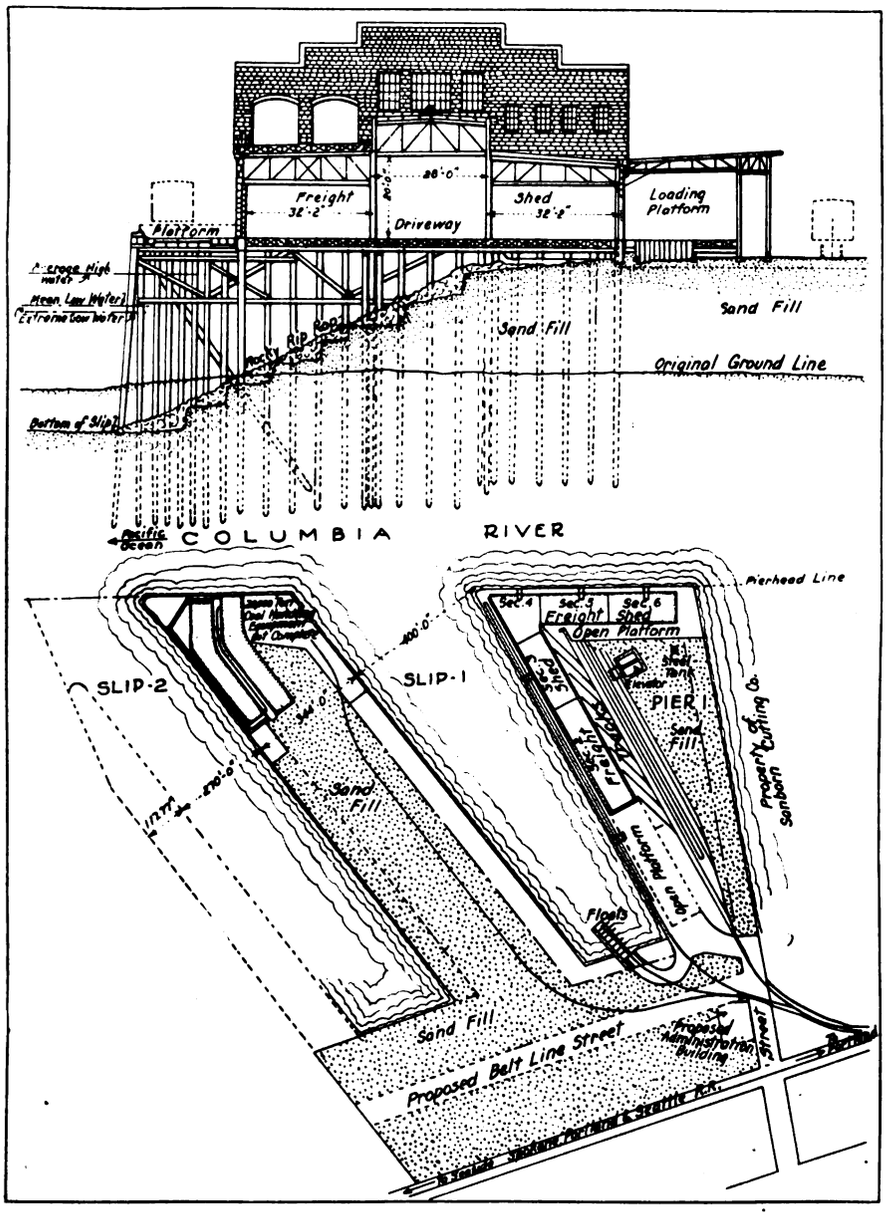
James Falconer goes with Capt. Babbitt as chief engineer of the steamer WILLIAM LIVINGSTONE, and Clinton Greenleaf who has been first assistant in the fleet for a number of years has been promoted to chief of the steamer HOWARD M. HANNA JR. Anthony Ward, who has been chief engineer of DAVID Z. NORTON will go in HARVEY D. GOULDER this season, and Chris. Johnson who was chief of the steamer SAMUEL MITCHELL goes in NORTON. Chief Engineer Gustin, who has been in WAINWRIGHT for the past two years has been retained, as have also the chief engineers and masters of the steamers SENATOR and COLONEL.

Lock Opened at Seattle

With the flooding of the Salmon bay lock of the government Lake Washington canal, at Seattle, vessels now have an ideal channel for entering or leaving that inlet of Puget sound.

The lock was recently flooded and since then has been used by tugs, freighters, passenger launches and other vessels, the former channel being closed to navigation so that the United States engineers can begin work on the dam to be built at that end of the bay. The lock will be formally placed in operation on the completion of the dam, July 1. Until then its gates will be kept open to allow vessels to pass through.

An appropriation has been included in the river and harbor bill for the completion of work on the canal.



CROSS SECTION AND GENERAL PLAN OF NEW PUBLIC DOCKS AT ASTORIA, ORE.

On the Coasts, Lakes and Rivers

What's Doing and Who's Doing It

Up and Down the Great Lakes

By A. A. Eiben

THE Manitowoc Ship Building & Dry Dock Co., Manitowoc, Wis., has been given a contract to build two steel motor vessels for the Berg-Hansen Co., Christiania, Norway. The vessels will be twin screw and of canal size, being 261 feet over all, 42 feet 6 inches beam and 23 feet deep; single deck with forecastle, bridge and poop decks, four large cargo hatches, two masts; six cargo booms and six hoisting engines; double bottom all fore and aft for oil fuel. The vessels will be designed by Babcock & Penton, of New York and Cleveland, and will be built under Lloyds' classification. They will be propelled by two Bolinder motors of 320 brake horsepower each, which are expected to give a speed of about nine knots at 18½ feet draft.

* * *

The Association of Lake Lines, organized in 1895, will be dissolved on March 31, as a result of the order of the interstate commerce commission divorcing railroads from package freight lines under the Panama canal act.

* * *

The recent announcement issued by vessel owners to the effect that $1,000 per day as demurrage charges will be made on all their boats not unloaded by April 1, has caused considerable commotion in grain circles at Buffalo. On March 6, there were at Buffalo, 32 vessels containing 9,000,000 bushels of grain still to be unloaded, and as there is little demand for American grain at this time and considerable difficulty is experienced in securing ocean tonnage, elevator men fear that all the vessels will not be unloaded in contract time.

* * *

Considerable repair work has been lined up at the yard of the Buffalo Dry Dock Co., Buffalo. The steamers T. H. WICKWIRE, J. J. BOLAND and A. E. CORNELIUS are among the vessels which will be docked and repaired before the opening of navigation. These three vessels were damaged last fall.

* * *

The steamer HENRY B. HALL has been sold by the George Hall Coal Co., Ogdensburg, to Adolph H. Lonov, Montreal. HALL was formerly the IRON DUKE and was built in 1881. The wooden steamer ROUMANIA of the Richardson fleet was recently sold to the Cuyahoga Transit Co., Cleveland.

* * *

Local inspectors in the steamboat inspection service in the Cleveland district continue to work long hours in an endeavor to minimize the delay which is likely to occur at the opening of navigation, as a result of the operation of the seamen's act. Additional inspectors are assisting the regular staff, but only slow progress is reported. The examination of applicants for certificates is occupying a large part of the inspectors' time and is preventing rapid work on the vessels. Vessel men fear that a part of the fleet moored at Cleveland will be delayed a week or more after the opening of navigation.

* * *

It is likely that the practice of carrying passengers on lake freighters will be terminated through the order recently issued by the department of commerce under the provisions of the seamen's law. The new law provides that any vessel carrying passengers for hire or otherwise must have a certain number of watertight bulkheads and must in other respects comply with the rules laid down for regular passenger vessels, and it is announced that the rule will be strictly enforced by local inspectors. The rule is also interpreted to prohibit masters from carrying their wives aboard ship. Protest against such an interpretation will doubtless be made by the Ship Masters' Association. The vessel operators consider this latter phase to be one governing the master personally, and will let the matter rest with the captain, claiming that if any penalty for violation of the law be enforced, it will be against the master himself and not the vessel.

* * *

Rules 1 and 5, governing the navigation of the Detroit river, were recently modified and now read as follows:

"1.—No vessel of 100 gross tons or over shall navigate the Livingstone Channel at a rate of speed greater than 12 statute miles per hour between its junction with the Amherstburg channel at Ballards reef and the Bar Point light vessel.

"5.—No vessel shall pass another vessel bound in the same direction in that portion of Livingstone channel between its junction with the Amherstburg channel at Ballards reef and Bar Point light vessel; nor at any other portion of either channel where the width of the channel is restricted by improvements in progress. Between any two downbound vessels entering or navigating that portion of Livingstone channel between its junction with the Amherstburg channel at Ballards reef and Bar Point light vessel there shall be a time interval of not less than five minutes. Tugs without tows and vessels under 100 gross tons are exempt from this rule."

* * *

The steel steamer MARYLAND, only recently acquired by W. C. Richardson & Co., Cleveland, has been sold by that company to eastern parties and the steamer will be use in coast service. She will be cut in two in order to pass through the Welland canal. The machinery of MARYLAND is located amidships and the vessel is in good shape for salt water service.

* * *

The American Ship Building Co., Cleveland, recently closed contract with the Standard Oil Co. for a barge, to come out next November, for service on the coast. The barge will be of Welland canal size and will be built at the Cleveland yard.

On the Delaware River

By Dr. C. S. Street

THE Philadelphia Bourse has prepared a protest against the administration's shipping bill, which will be placed before the congressional committee on merchant marine and fisheries. This action was taken in response to a letter from Congressman George W. Edmonds. While condemning the principles underlying the bill, the Bourse indorses certain details of sections, such as the chartering to private parties, in times of peace, of government vessels suitable for commercial use; the right of the government to commandeer in times of war any vessel flying the American flag, and the enrollment of officers and crews of American vessels as members of a United States naval reserve.

* * *

The steamer ANTHONY H. GROVES JR. of the Ericsson line, became unmanageable recently at the mouth of the Delaware and Chesapeake canal, Delaware City when she lost her propeller. The steamer remained stranded until help was obtained from Philadelphia.

* * *

Two vessels costing $1,700,000 each, to be built by the William Cramp & Sons Ship & Engine Building Co., Philadelphia, for W. R. Grace & Co., will not be begun until the latter part of this year. The ships will be duplicates of SANTA BARBARA, recently completed by the Cramps. SANTA ROSA and SANTA PAULA are now under construction at the Cramp yard for the Grace line.

* * *

The steamer CRETAN of the Merchants & Miners Transportation Co., which left Philadelphia recently with a large cargo for Savannah, Ga., and Jacksonville, Fla., collided with a schooner off Cape Hatteras. The steamship DOROTHY stood by and transferred all passengers, after which both vessels steamed for Norfolk. ONON-

DAGA and SAN JACINTO also escorted the disabled vessel. CRETAN was formerly TALLAHASSEE of the Ocean Steamship line. She was built by the Roach Ship Building Co., Chester, Pa., in 1882, and is a steel vessel, 280 feet in length over all, 40 feet keel, and 24 feet depth of hold. She registers 2,677 tons.

* * *

The new municipal docks on the inlet at Atlantic City will accommodate the fishing fleet, truck boats, steamer lines from Philadelphia, and various pleasure vessels.

* * *

Freight lines on the Delaware river and its tributaries opened for business recently. Twenty or more sidewheelers are now being built to take care of the truck and cargo trade on surrounding creeks and rivers. These boats, which it is said, will not clog with weeds or creek grass, will make schedule runs to several important cities located between Cape May and Philadelphia.

* * *

Matt Murphy, Peens grove, has figured out a schedule for opening the many bridges on Oldmans creek, Salem river, Cohansey river, Mantua river, and others.

* * *

The ferry boat SALEM recently rammed the Clyde line steamer MOHICAN, causing a panic on the former vessel. The crew of the ferry boat had trouble in quieting its four hundred passengers. No one was injured.

* * *

The city of Philadelphia, together with several business men, has taken over a large tract at Essington, Pa., for an aviation ground. Existing docks will be enlarged and landing stages and hangars built. Instruction in aviation will be given, it being planned to make the place self-supporting. More than 50 men have so far signed on for the training. Two hydroplanes and four large motors have been secured. All instruction flights will be made over the Delaware river, to guard against accident.

On the Chesapeake

By Hollis F. Bennett

THE Baltimore Dry Dock & Ship Building Co. has completed improvements to its upper plant at the foot of Cross street, Baltimore, with two new shipways capable of building ships up to 400 feet in length. Two new overhead runways with traveling cranes will serve these building slips. New ship sheds and joiner shops will be added, the improvements necessitating an expenditure of about $500,000. The company has recently secured contracts to build two ships for the Standard Oil Co. These vessels bring the total of contracts which the company has under way to 11. The first of four ships equipped with Bolinder semi-diesel engines, building by this company for Christoffer Hannevig, Christiania, Norway, has been sold to the Vacuum Oil Co. Changes to suit new requirements are being made under the supervision of Marine Superintendent Smith. The company expects to deliver the ship in July.

* * *

Thomas Benson, until recently marine superintendent of the Baltimore, Chesapeake & Atlantic and the Maryland, Delaware & Virginia railroad lines, has accepted the position of assistant to the president of the new Standard Shipbuilding Co., Shooters Island, N. Y.

* * *

The new American-Hawaiian steamship ARTISAN recently underwent her standardization trials over the Kent island course, after which she proceeded on her voyage to Chile. ARTISAN was built specially for the lumber trade, but will not engage in it on account of high freights and the closing of the Panama canal.

* * *

The New York & Baltimore Transportation Co.'s steamship PORTO RICO has been sold to the Bluefields Fruit Co., New Orleans. The ship was taken to New York, and the Robins Dry Dock & Repair Co., Erie basin, are now making necessary alterations to fit her for the new service. She will ply between Bluefields, Nicaragua, and New Orleans. PORTO RICO was built in Toledo, O., in 1899, and for many years plied between New York and Porto Rico ports in the service of the New York & Porto Rico Steamship Co.

* * *

The recent appearance at Baltimore of six square-rigged ships recalled the days of the Rio coffee clippers. The vessels, which were all Italian, loaded coal for Mediterranean ports.

* * *

The steamships GEORGE E. WARREN, L. V. STODDARD and GEORGE HAWLEY, owned by the Boston & Virginia Steamship Co., are to be lengthened 50 feet and converted into oil tankers.

* * *

The Baltimore barge HARRY F. HOOPER, owned by the Eastern Transportation Co., was recently abandoned in the vicinity of Diamond Shoals lightship.

* * *

The steamship ARBOREAN, built by the Maryland Steel Co., Sparrows Point, Md., for the American-Hawaiian Steamship Co., and a sister ship to ARTISAN, was launched recently.

New Orleans and the Gulf

By H. H. Dunn

RESOLUTIONS in favor of an American merchant marine were unanimously adopted by the Lumberman's Club of Memphis, Tenn., at its last meeting. Lack of a merchant marine flying the Stars and Stripes is stifling the lumber business of the south, according to speakers at this meeting. Copies of the resolution are to be sent to the president, and to congressmen from Mississippi, Tennessee and Arkansas.

* * *

The first self-propelled barge of the Inland Navigation Co. will leave St. Louis with a full cargo, bound for New Orleans, on April 15. The new vessel, which is driven by Fairbanks-Morse engines, will arrive in New Orleans April 25, and thereafter will make regular trips up and down the river between the two points. The new barge, which follows the general lines of those now in use by the Alabama & New Orleans Transportation Co., in hauling coal from the Alabama fields to New Orleans, has a capacity of 1,600 tons and cost $94,150. She is the smallest of 30 barges of the same type which are to be built by the company. She was constructed at Jeffersonville, Ind., where another and larger barge for the fleet is now being built. The largest, or No. 3 type, will cost $312,000, according to John H. Bernhard, active head of the Inland company. All are to be electrically equipped and will carry double crews of seven men each. The pilot house is so connected by telephone and electrical controls that the entire machinery of the barge can be handled from that point.

* * *

Schooners, auxiliaries and steamers will be badly wanted in New Orleans for the carrying of 100,000,000 feet of lumber to Mexico, if the national railways of that republic succeed in placing this large order with Louisiana lumbermen. The Carranza government has offered to garantee the notes of payment to be issued by the railroad, but there is some doubt among the lumbermen as to the permanency of the de facto government, and this may delay the deal. The railroad company has two men in New Orleans trying to buy the lumber, which is wanted for repairs to the railroad and telegraph lines from damages wrought by the revolutionists.

* * *

From January 26 to February 10, 1916, 11,951,000 feet of lumber moved by water out of Pensacola, Fla. More than 80 per cent of this huge shipment went to the war zone in Europe.

* * *

Both the steam and sailing vessel markets in New Orleans were strong throughout February, with steadily increasing scarcity of carriers of both kinds. Chartering was limited by extremely light offerings of either present or future delivery. There is a good demand for general bottoms, such as for flour, sugar, cotton and grain. Rate advances are recorded.

* * *

The British tramp steamer BARON NAPIER, Captain B. Cameron, has arrived at New Orleans, reporting that she was chased by a German submarine when four days out of Alexandria, Egypt, bound for New Orleans. Captain Cameron said the submarine shelled him, but that BARON NAPIER escaped by flight, though she was damaged by the shells and several of her men injured by flying splinters.

* * *

Orange, Texas, has been made a customs station with power to clear its own vessels. Collector R. E. Latimer, of Port Arthur, has been instructed to appoint a deputy collector. Beaumont shippers are attempting to secure the same concession for that port.

* * *

Relief of the cotton shippers from New Orleans to Italian ports is promised in dispatches received in the Crescent City stating that the Italian admiralty has promised to release several ships for March loading at New Or-

leans and other Gulf ports. The order of seizure of the vessels by the Italian authorities affected the Creole and the Pearce Cottoneira lines, and the change is believed to have been caused by appeals of the New Orleans cotton exchange and New Orleans shippers to the Italian government.

* * *

Gulfport, Miss., shippers offer as high as $24 a thousand feet freight on lumber to River plate points, with practically no takers.

* * *

The Gulfport, Miss., ship channel has been deepened by government dredge, to 21 feet, and big steamers can now go through to Ship Island harbor.

* * *

The British schooner EVADNE, out of Mobile, January 3, has been wrecked near Little Key, Fla., and, with her cargo of yellow pine, is a total loss. The captain and crew were saved.

Around Boston Bay

By George S. Hudson

UNDER orders from the department of agriculture, all cotton received at Boston from foreign ports must be fumigated, the work entailing considerable delay incident to rehandling. A large amount of the cotton comes from Egypt, being transshipped from Liverpool. The order is designed to prevent introduction of the boll weevil.

* * *

The first direct passenger sailing for years between South Africa and Boston was that of the British steamship CITY OF SPARTA, Capt. McKellar, which arrived recently from Capetown with 28 passengers. The ship regularly runs between Australia and India, but was diverted as she is to enter war service as a transport.

* * *

On account of a strike at a Plymouth, Mass., cordage plant, several ships with cargoes of sisal fibre from Progreso have been unloaded at Boston during the past month.

* * *

An explosion of gasoline vapor on board the fishing schooner MARY C. SANTOS at the fish pier, Boston, resulted in the vessel going to the bottom with the loss of two men. SANTOS, which was subsequently raised, is owned by Capt. Manuel Santos of Provincetown.

* * *

The Boston fishing schooner MARGARET DILLON has been sold by M. J. Dillon to Capt. Francisco Carballo of Havana, and transferred to Cuban registry. The fishing schooner WASHAKIE has been sold to Pensacola interests.

* * *

The Boston & Virginia Steamship Co. has moved its offices from Boston to New York. Three of the company's steamers, GEORGE E. WARREN, L. V. STODDARD and GEORGE HAWLEY, are to be converted into oil tankers.

* * *

Offerings of grain for export find a shortage in the tonnage market and bookings have been made by vessels leaving Boston for England as late as next June. The rate on wheat to Liverpool and Glasgow stands at 48 cents per bushel, the highest figure in recent years.

* * *

During a recent gale the two-masted British schooner CORA MAY, Capt. Lewis, from St. John, N. B., for Boston, with a cargo of 139,000 feet of spruce lumber, parted her cable in Boston lower harbor and went ashore on False Spit. The vessel was floated by the tug MERCURY, Capt. Wall, and towed to East Boston for repairs.

* * *

One thousand tons of cocoanut oil was brought from Japan to Boston in a ballast tank of the British steamship ST. BEDE, Capt. Fortay, thus leaving hold space for general cargo.

* * *

A record shipment of Egyptian cotton, 6,000 bales, was brought to Boston from Liverpool the other day in the Leyland line steamship ETONIAN, Capt. Wood. The value of the consignment was $1,345,000.

* * *

The steamship SEACONNET, owned by the Shawmut Steamship Co., is frozen in at Archangel, Russia.

* * *

Capt. C. R. Tuckett of the customs guards, has charge of a neutrality patrol in Boston harbor, the treasury department tug DREAMER being used in the work.

* * *

Capt. Alfred E. Ellis, for 25 years connected with the Plant line, died recently at his home in Halifax, N. S. Capt. Ellis had commanded the steamers A. W. PERRY, HALIFAX and EVANGELINE on the Boston-Halifax run.

* * *

The schooner MAY V. NEVILLE has been chartered to load at Boston a cargo of rum, tobacco and flour for the west coast of Africa.

* * *

The steamer MT. HOPE has been overhauled at the Atlantic Works, East Boston, at an expense of $15,000, and has returned to Providence, R. I.

* * *

Alterations calculated to fireproof steamer CAMDEN of the Eastern Steamship Corporation, have been completed, and the vessel will soon go on the run between Boston and Bangor, Me.

* * *

German steamships laid up at Boston wharves have been shifted to prepare berths on the east side of the harbor.

Along Puget Sound Shores

By F. K. Haskell

CAPTAIN RICHARD CHILCOTT, veteran master mariner, is receiving the support of many Pacific coast shipping men in behalf of a bill he has compiled, having as its purpose the encouragement of private enterprise and capital in upbuilding the American merchant marine. The measure was first introduced by Senator Harry Lane, of Oregon, in the senate, and was placed before the house by Congressman C. N. McArthur, also of Oregon. It is called the board of maritime control bill. The measure grants authority for three or more native born or naturalized American citizens to incorporate and build, buy or operate vessels between ports in the United States and those of other nations, except Canada and the West Indies, with power to issue ten-year bonds in denominations of $100 each, drawing 6 per cent, up to an amount equal to 80 per cent of the capital stock of the corporation concerned. However, at the time the bonds are issued there must have been paid into the treasury of the corporation on stock subscriptions 25 per cent of the value of the securities. The government is to guarantee the interest. The proceeds of the bonds are to be devoted exclusively to the construction, purchase and operation of vessels in the merchant marine trade. The measure provides that the government shall guarantee the interest on the bonds at a rate not exceeding 6 per cent per year for ten years, when the bonds shall mature, the government guaranteeing the payment of the principal and interest of the bonds at that time.

* * *

J. H. Burton, commercial agent of the Pacific Alaska Navigation Co. and one of the most widely known steamship men on the coast, has been appointed city passenger and ticket agent for that company, with headquarters in Seattle.

* * *

The United States lighthouse tender ROSE, which will serve the seventeenth district, with headquarters at Portland, Ore., was launched recently at the Anderson Steamboat Co.'s yards, Seattle. ROSE, when completed, will cost approximately $110,000.

* * *

Seattle is to meet the competition of Prince Rupert as a gateway to Alaska. Cheaper fares via a more direct route, as a result of the completion of the Grand Trunk Pacific Railway Co.'s transcontinental line, for a time threatened to divert an important amount of travel to the North Pacific's newest port, but action taken during the past month by the North Coast Passenger Association removes this danger and places Seattle on an equal footing with her northern neighbor. Railway and steamship lines have agreed on the establishment of the same one-way through fares between Alaska ports and Eastern territory via Seattle as now apply via Prince Rupert.

* * *

The Blue Funnel line withdrew its service from Puget sound on March 4, when the seaman's law, affecting foreign vessels trading into United States ports, went into effect. The first vessel to come under the law was TALTHYBIUS. The line is making new terminal arrangements at Vancouver, B. C. The Japanese lines plying into Puget sound will not be affected, as their officers and sailors are all Japanese. The action will leave only Japanese vessels plying in the foreign trade from Puget sound.

Red Hot Tips From the Trade

Pertinent Suggestions and Personal Gossip

A THIRTY-PAGE booklet containing interesting matter pertaining to heavy oil engines for auxiliary trading vessels is being circulated by Bolinders, Stockholm, represented in the United States by the Bolinders Co., 30 Church street, New York. Aside from the actual description of the engines, there is a convincing argument for the use of engines as emergency power units on sailing vessels. Among the advantages claimed for sailing craft thus equipped are the higher freight rates obtainable, maintenance of regular speed throughout voyage, elimination of towage expense, saving of salvage if dismasted at sea, and possibility of more safely navigating the vessel in bad weather.

The principal feature of the Bolinder engines is found in the design which does away with the necessity of water injection. The elimination of fresh water tanks is an achievement which will appeal to men who have experienced the inconvenience of maintaining a supply of water throughout a voyage. In avoiding the injection of water, the company has employed an entirely new method which is said to make the exhaust odorless and smokeless. Another advantage claimed for the engine is the low working pressure which insures it against the many troubles attributed to abnormally high pressures. Simplicity is another feature strongly emphasized in the catalog. The absence of cams, valves, gearing, electric ignition, or vaporizer makes it possible to operate the engine without the services of a trained engineer. All parts are standard and interchangeable.

Moore & Scott Busy

The Moore & Scott Iron Works, San Francisco, has recently closed a contract with James Rolph, mayor of San Francisco, for a steel freighter of 7,200 tons deadweight capacity. This vessel will be 376 feet in length, 52 feet 3 inches molded beam and 28 feet molded depth. Contract price is $700,000 and the vessel will be delivered Dec. 31, 1916. She will be equipped with three Scotch boilers and will be propelled by a Curtis turbine of 2,400 horsepower.

The Moore & Scott company also is figuring on several other boats of the same size or larger, covering which it is expected contracts will be executed at an early date. In addition, the Moore & Scott company is building a steel dredge 120 feet long for use in the Mexican west coast gold fields. The company is spending nearly $100,000 in improving and increasing the capacity of its dry dock and yard facilities for handling construction and repair work.

Pumps for Ships

The line of centrifugal pumps designed and built by the Dayton-Dick Co., Quincy, Ill., is illustrated and described at length in a recent catalog. Among the advantages claimed for these pumps are: Ring oiling bearings are separate from the casing; the pumps are hydraulically balanced against the end thrust; all parts are readily accessible by removing the top casing; shaft is provided with sleeves extending through the stuffing boxes. The catalog illustrates these pumps in service, complete descriptions being given of their design and manufacture. The catalog also describes the company's pumps for automatic bilge service, automatic receiver service, and its portable pumping units, both of vertical and horizontal construction. A number of useful tables are given.

About Commandeering

To the Editor:—

On page 104 of the March issue of *The Marine Review*, there is an implied statement that the United States government cannot obtain ships for service as transports in time of war except through ordinary charter negotiations. Is the government not in a position to commandeer ships at present, if the occasion warranted such a procedure, without special legislation? Also, on page 103, you refer to the proposed shipping board of five members. Will you kindly state whether any or all of the five members are ship owners?

It is probable that in a time of extreme stress the President, acting under his constitutional authority as commander-in-chief of the army and navy, could commandeer merchant tonnage for the purposes of the government, but it is believed this would be a procedure which at present has no specific statutory sanction. Many people, therefore, consider it desirable to enact legislation which would clearly enable the government to commandeer merchant tonnage in times of war, with due provision for suitable compensation to the owners of such property.

Up to date there has been no consideration of the personnel of the shipping board recommended by the National Foreign Trade Council. The council recommends that the five members "shall be men experienced in shipping and foreign trade". This does not necessarily imply that they be ship owners, and it is not probable, if the board is ever created, that all of the members would be ship owners.

Sells Metal Polishes

The George William Hoffman Co., Indianapolis, Ind., is manufacturing an extensive line of powder, paste and liquid polishes, especially adapted for marine use. The paste is said to be non-inflammable while the powder is non-combustible. The products are said to be unaffected by age and will not deteriorate. The Hoffman company has been manufacturing metal polishes for more than 33 years.

Personal

Savine L. Craft has received a probationary appointment as local inspector of boilers at St. Michael, Alaska. Robert T. Bain received a similar appointment as assistant inspector of hulls at Seattle.

John E. Wilson, assistant inspector of boilers at New York, was recently promoted to the position of local inspector of boilers at Philadelphia, Pa.

The temporary appointment of Mrs. Marie C. Salas as clerk to the local inspectors at Savannah, Ga., and of Oswald D. Quinlan as clerk to the local inspectors at Detroit, Mich., were recently discontinued.

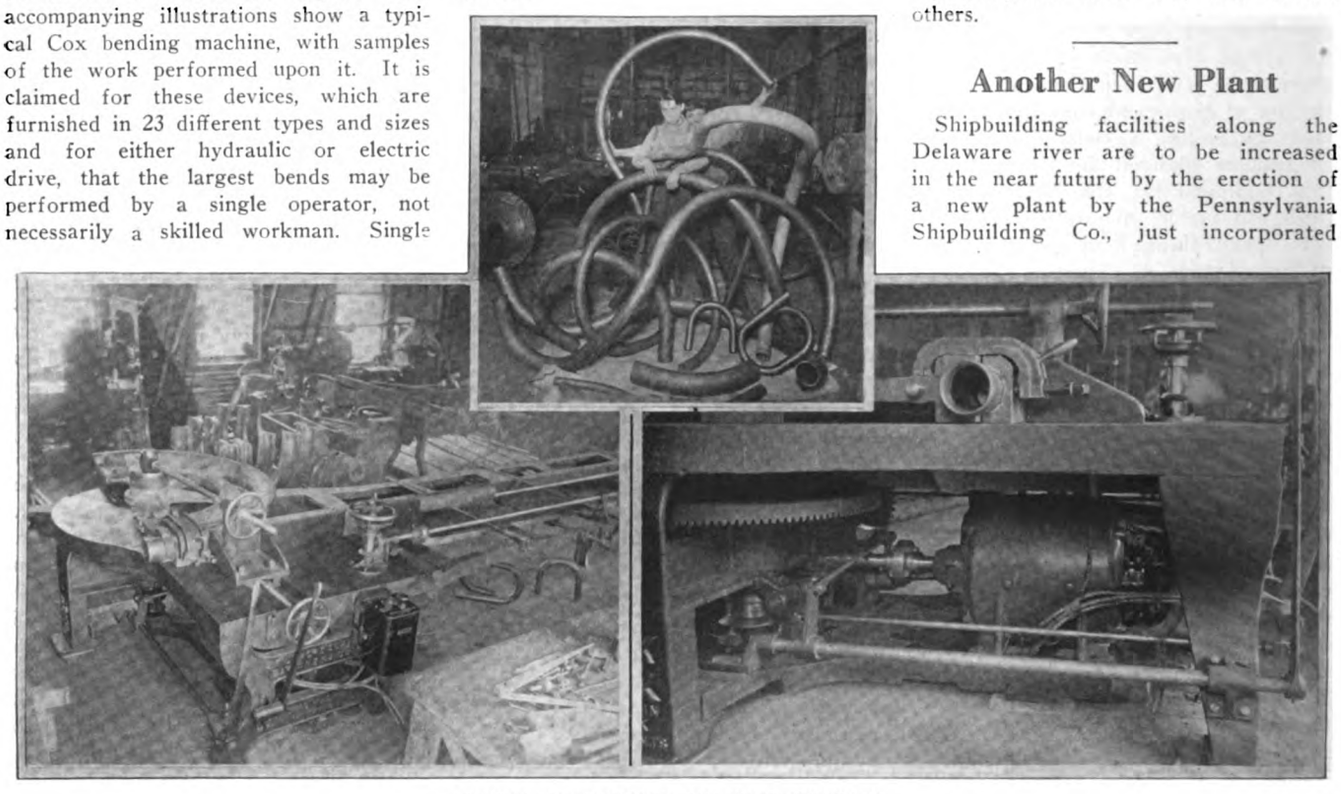
Benjamin O. Nickerson has received a temporary appointment as clerk to the local inspectors at New York.

David H. Howard, local inspector of boilers at Philadelphia, Pa., died on Jan. 7, 1916.

Equipment Used Afloat and Ashore

Pipe Bending Machine—New Ship Building Plant

PIPE bending machines varying in size from small portable outfits to large installations capable of handling 6-inch steel pipe or 10-inch brass or copper pipe, are manufactured by the J. Fillmore Cox Engineering & Tube Bending Machine Works, Bayonne, N. J. The Cox company has recently augmented its line to a considerable degree. The accompanying illustrations show a typical Cox bending machine, with samples of the work performed upon it. It is claimed for these devices, which are furnished in 23 different types and sizes and for either hydraulic or electric drive, that the largest bends may be performed by a single operator, not necessarily a skilled workman. Single or duplicate bends, it is said, are made with almost equal facility, only a few seconds being required to change accessory equipment for the bending of the largest or smallest size of pipe which can be handled. These machines are now in use by the Brazilian and Russian governments and other large marine interests, in the United States and abroad. The Cox company also manufactures special and standard coiling machines for making spirals, zigzags and open and closed coils.



WORK PERFORMED ON COX BENDER

COX BENDING MACHINE, ELECTRIC DRIVE

DETAIL OF MOTOR DRIVE

The present urgent necessity for additional ocean tonnage is shown in the recent purchase by the Standard Oil Co. from the Smith Shipping Co. of a fleet of six freight vessels. These boats are now under construction from the designs and under the superintendency of Cox & Stevens, naval architects, at the yards of the Toledo Ship Building Co., Toledo, O. The order for the vessels was placed in August, 1915, as the Smith Shipping Co. anticipated an unusual demand for boats. The vessels are designed to carry 3,000 tons dead weight; they are to be propelled by heavy oil engines and to have sails in addition, capable of driving the vessels at a satisfactory speed under ordinary conditions at sea.

Build Norwegian Craft

A contract for six freight vessels recently placed with the Manitowoc Shipbuilding & Dry Dock Co., Manitowoc, Wis., brought the total number of boats recently placed in this country by Norwegian shipping interests to more than 28. Norwegian maritime companies, in view of the present extraordinary level of ocean freights, are enjoying great prosperity, which calls for large additions to carrying capacity. Since these cannot be obtained in sufficient supply at home, in England or other countries abroad, new construction contracts have gone to the United States. In the past, Norway had obtained most of her boats from England. The six ships to be built at the Manitowoc yards will be of about 3,000 tons each. Other vessels recently awarded by Norwegian interests to American yards, include six 3,300-ton vessels to the American Shipbuilding Co.; five tank steamers of 5,000 tons each to the Baltimore Dry Dock & Shipbuilding Co.; two 9,340-ton boats to the Union Iron Works, San Francisco; three 9,000-ton tank steamers to the Chester Shipbuilding Co., Chester, Pa.; four 3,300-ton boats to the Toledo Shipbuilding Co., and one 3,000-ton vessel to the Maryland Steel Co., and several others.

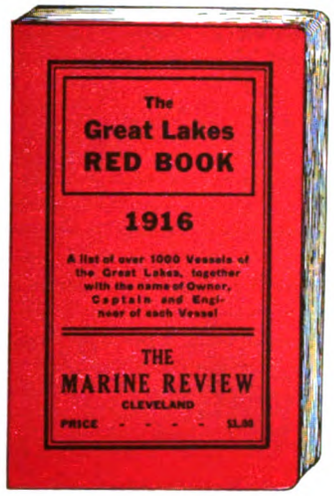
Another New Plant

Shipbuilding facilities along the Delaware river are to be increased in the near future by the erection of a new plant by the Pennsylvania Shipbuilding Co., just incorporated with a capital of $600,000. The site of the new yard has not yet been announced but it is understood that operations are expected to be inaugurated in August of this year. The company, according to its officials, has taken orders for six ocean-going vessels, all of which are for Norwegian owners and inquiries have been put before steel makers for the necessary material for these ships. Haakon E. Norbom, of Germantown, Pa., is president of the company; Geo. S. Hoell, who has been secretary of the Norbom Engineering Co. for eight years, is secretary and treasurer; Chas. H. Moyer, of Philadelphia and New York, is vice president, and Henry Lysholm, of Philadelphia, general manager. Mr. Lysholm has been connected with the New York Shipbuilding Co., Camden, N. J., since that yard was established.

Index to Advertisements

The Great Lakes Red Book

1916 EDITION



Actual size 3" x 4¾"

Just fits the vest pocket

Bound in tough, long-wearing imitation red leather

Price
$1.00 Post Paid

Check, money order, currency or U. S. Stamps accepted as payment

Ready April 1st

Contains the same features which in past years have made this book so useful to everyone connected in any way with the lake trade.

A list of the vessels operating on the Great Lakes.

A separate list of ore carriers showing the tonnage of each.

A list of the owners of lake vessels, with the names of the boats owned by each, and the names of the managers and superintendents.

A list showing the name of the captain and the engineer of each vessel.

A port directory of the Great Lakes, listing supply houses, fueling docks, ship chandlers, etc.

Orders received now, before the rush begins, will be sure of receiving the most prompt and careful attention.

For your convenience we are printing an order blank at the bottom of this page. Use it to-day, and get one of the first copies off the press.

Tear off along this line, and mail with your remittance

Advance order—for PROMPT attention

THE MARINE REVIEW,
Cleveland, Ohio.

Date.....

Enclosed find $.....for.....copies of The Great Lakes Red Book, 1916 Edition. Kindly acknowledge receipt of this order.

Name.....

$1.00 a Copy
Post Paid

Address.....

.....

Please mention THE MARINE REVIEW *when writing to Advertisers*

GREAT LAKES ENGINEERING WORKS

DETROIT, MICHIGAN

ANTONIO C. PESSANO
President and General Manager

JOHN R. RUSSEL
Vice President and Treasurer

H. W. HOYT
Vice President and Secretary

Four types of ships built by us for Ocean and Coastwise service

These vessels received certificates of highest classification in British Lloyds and the American Bureau of Shipping

Ship Repairing

Dry Docks of Largest Capacity

Ship Yards and Engine Works at

Detroit and Ecorse, Michigan

Ashtabula, Ohio

Please mention THE MARINE REVIEW *when writing to Advertisers*

Classified Advertisements

Wanted and For Sale

RATES

All Classified Ads.—four cents (4c) per word. No advertisements accepted for less than $1.00.
Remittance should accompany order for one-time ads.

IMPORTANT

Seven (7) words must be allowed for box address.
To insure insertion, copy should reach us before the 9th of the month.

Help Wanted

WANTED:—MECHANICAL DRAUGHTSman, accustomed to marine engines, boilers and piping. State experience, age and salary expected. Address Box 123, THE MARINE REVIEW, Cleveland, O.

For Sale

Clarence L. Parker, Vessel Agent,
Foot of First Street,
Detroit, Mich.
Sells and Buys Boats of every class and type.

FOR SALE:—STEAM SAND SUCKER, fully equipped; capacity 180 yards, length 117 feet, beam 23 feet; draft; light 7 feet, loaded 10 feet; at a bargain price if taken at once. Address Box 94, THE MARINE REVIEW, Cleveland, O.

THE OWNER OF THE CHOICE MILwaukee built, 300 ft. freight steamer Thomas Davidson (3,500 tons coal) retiring management now offers her for sale. Also the barge Baltic, about seventy thousand corn or wheat; twelve hundred thousand lumber capacity; large repairs recently. Towing machine, new cable, pumps, etc. Best offer takes them. H. J. Pauly, 165 Eighteenth St., Milwaukee, Wis.

FOR SALE: — COARSE FREIGHT steamer, 1,000 tons capacity, and two Barges, 1,200 tons each. All in first-class condition and carry highest Great Lakes rating. Address Box 112, THE MARINE REVIEW, Cleveland, Ohio.

FOR SALE: — SCHOONER JENNIE Weaver. Boat and running gear in good condition. The Mihlethaler Company, Ltd., Harbor Beach, Mich.

FOR SALE.—GAS BOAT GLORIANA. Built in 1913. 62 ft. overall, 13 ft. beam, 6 ft. deep. 75-H. P. Kahlenberg engine. Speed 13 miles. E. G. Endress, Sault Ste Marie, Mich.

FOR SALE:—STEAMER MOHEGAN IN thorough condition throughout; rates 95 high power; two new Scotch boilers 11 ft. 6 in. x 14 ft. 6 in.; steel boiler house; recently in dry dock; will run 12 miles an hour light or loaded; capacity 1,200 M. ft. lumber; 1,600-1,700 tons coal. Also for sale, consort Mingoe, light draught, good condition, capacity 950 M. ft. lumber, 1,200-1,300 tons coal. Address Graves, Bigwood & Co., Buffalo, N. Y.

FOR SALE: — WOODEN STEAMER Caledonia, 277 ft. x 42 ft. x 21 ft.; capacity about 3,000 tons; fore and aft compound engine, 24 in. and 44 in. x 42 in. stroke; Two Scotch boilers, 10 ft. diameter x 11 ft. long, for 130 pounds; may be seen at the Ecorse Yard of the Great Lakes Engineering Works, Detroit, Mich. Would make first-class tow barge and will be sold cheap. For further particulars apply 1304 Rockefeller Bldg., Cleveland, Ohio.

FOR SALE—TWO, 4-CYLINDER, 40-H. P. Holliday gasoline marine engines, with shafts and wheels. Hibbard Spencer Bartlett & Co., State Street Bridge, Chicago, Ill.

FOR SALE:—STEAM SCREW STEAMER Eugene C. Hart, official number 136, 131 passenger and freight steamer, 152.5 feet long, 25 feet beam and 9 feet 4 inches depth. This steamer can be had at a bargain. The Michigan Trust Co., Trustees, Grand Rapids, Mich.

For Sale

FOR SALE WOODEN STEAMER WINnipeg lumber capacity 1,100,000 feet, coal 1,700 tons. Rebuilt recently. Address D. H. Andrews, Ellicott Sq., Buffalo, N. Y.

FOR SALE: — OR WILL EXCHANGE for tug, the passenger steamer Hazel; licensed last year to carry 160 passengers on Detroit river; would give or take difference. Address 1749 Summit St., Toledo, O.

FOR SALE.

Steamer "DALLAS" ex-Revenue Cutter. Length of keel, 131 ft., beam 22-ft. 6-in. First class condition, solid timber in bottom, frames 6-in. x 12-in. spiked together above Bilge. from there double frames spaced with only 6-in. between. Outside planking 3-in. oak. Inside planking 5-in. yellow pine extending 2-ft. below Bilge. Main Rail Oak 4-in. x 12-in. Stanchions 6-in. x 6-in. Steel Quadrant. Price, $3,000. Photographs on request. Manistee Iron Works Co., Manistee, Mich.

For Sale

PLANT FOR SALE: — ONE THREE cubic yard dipper dredge; 1 Tug Boat, 13 x 15 cylinder, hull 40 feet x 13 feet x 6 feet; 3 derrick scows; 1 flat scow 76 feet x 24 feet x 7 feet 6 inches; 2 three hundred cubic yard mud scows; one 1½ yard orange peel bucket; one 1¼ yard Williams clam shell bucket; one direct connected ¾ cubic yard concrete mixer; one marine lake type boiler 16 feet long, 9 feet in diameter, built for 145 pounds working pressure, heating surface 2,400 square feet. Great Lakes Construction Co., 1117 Chamber of Commerce building, Buffalo, N. Y.

FOR SALE:—SEVERAL VESSELS, ALL kinds and sizes; steam yachts, with speed exceeding 35 miles per hour; all in good condition and bargains. Prices, descriptions, etc., may be secured by addressing Box 100, THE MARINE REVIEW, Cleveland, O.

Classified Advertisements continued on following page

Classified Advertisements

Wanted and For Sale

RATES

All classified ads.—four cents (4c) per word. No. ad. accepted for less than $1.00.

Remittance should accompany order for one-time ads.

IMPORTANT

Seven (7) words must be allowed for box address.

To insure insertion, copy should reach us before the 9th of the month.

For Sale

SCHOONER ARENDAL FOR SALE cheap. She is 207 tons gross, 198 net; has rating of 85; length 123 ft. 6 in., beam 26 ft.; rebuilt last year. Capt. E. Neilson, Box 428, Muskegon Heights, Mich.

SEABERRY—FLUSH DECK CRUISER. Length 71 ft., beam 12 ft. 6 in. Two 50-H. P. Speedway motors, speed 11 to 12 miles. Built for salt water or Florida cruising, fine sea boat.

Accommodations for 8 beside crew. Stateroom and main cabin finished in mahogany, bath, three toilets, electric lights, high class throughout.

Boat now in Detroit, price very reasonable. Address Cruiser, 1716 West Grand Blvd., Detroit, Mich.

LUMBER BARGE FOR SALE, 850,000 capacity; in first-class condition. If you want a bargain see this one. Address Box 111, THE MARINE REVIEW, Cleveland, Ohio.

FOR SALE.
1—Providence Towing Machine.
2—Metallic Life Boats.
1—Double Drum Deck Engine.
1—Steam Capstan.
1—Improved Williamson Steering Engine.
Address 506 Smith building, Detroit, Mich.

FOR SALE CHEAP:—ONE WILLIAMson Bros. combined hand and steam steerer with stand and valve operating levers. Size of cylinders 6 in. x 6 in. In perfect condition. Price $300 each. Cost price $1,200. Address Jerry McCarthy & Sons, 157 Ohio St., Buffalo, N. Y.

FOR SALE

One second hand HYDE steam and hand drum steering engine with double engines 9 x 9. In first class condition. Price, $600.

One new HYDE double drum winch 8¼ x 10 link reverse. Has never been used. Price, $750.

Plans on application.

HYDE WINDLASS COMPANY,
Bath, Maine.

FOR SALE:—TUG 56 FT. x 12 FT. x 6 ft. Engine 10 in. x 10½ in. Boiler Scotch marine, allowed 125 lbs. steam, all in good shape. For particulars inquire of W. G. Mackie, Green Bay, Wis.

FOR SALE OR CHARTER

Steel passenger and freight boat
Splendid craft for good service.
C. H. Meister, 350 North Clark St.,
Chicago, Ill.

FOR SALE.
BOILERS
2 New Scotch 14-ft. 9-in. x 12-ft., 180 Steam.
2 S. H. Scotch 16-ft. x 12-ft., 160 Steam.
ENGINES
2 Quadruple 650 H. P. each.
14—22—33—44
1 Quadruple ——————
18
12—18—30
1 Triple ——————
16
20—34—54
1 Triple ——————
42
1 Simple 20-in. x 24-in.
Pumps, Dynamos, Windlasses, Capstans, Surface Condensers, Evaporators.
MARVIN BRIGGS, INC.,
167 Sixth St., Brooklyn, N. Y.

TUG FOR SALE:—HULL 47 x 12 x 6, engine 12 square, 120 lbs. steam. In commission last season. Jeffrey Tug Line, Duluth, Minn.

BARGE "CONNELLY BROS.", 201 x 36x 13½ ft. Carries Million lumber. Steam windlass and capstan. Two steam hoisters. Winter quarters Erie, Pa.

CAR FERRY TOW BARGE "No. 1", 309x44x12 ft. Gunwall built. Molded bow. Carries load all on deck. Has steam windlass, steam towing machine, ballast pump. Very light draft. Winter quarters Detroit, Mich.

HULL AND MACHINERY STEAMER "Charles Eddy". Hull needs repairs but machinery very good. Boiler 170 lbs. steam, Hodge triple engine. Pony boiler. Providence steam windlass. New Globe steerer. Iron rudder. Steel mast. Just the rig for steel hull. Now at Milwaukee.

Inquire Charles S. Neff, 2109 Grand Ave., Milwaukee, Wis.

FOR SALE:—TUG RUNNELS, 58.9 x 15.3 ft. depth 6.9, draws 8 ft. of water. Gross tonnage 37.87, net 18. 16 sq. high pressure engine. Boiler about 120 lb. Dorr E. Warner, Atty., Cleveland, O.

LARGE TUG FOR SALE, 73 FT. x 17 FT. x 10 ft. in size, with semi-Scotch marine boiler, allowed 140 pounds of steam, steam steerer, etc., entirely rebuilt last year, operating and in first-class condition.

ALSO SCOW 185 FT. x 35 FT. x 10 FT. capacity 800 yards sand or gravel. Last year installed modern 12-in. Morris centrifugal sand pumping outfit with large marine boilers, mooring engines and ballast pump. Address W. C. Farrington, 316 Moffat building, Detroit, Mich.

FOR SALE—LUMBER BARGE ALBERT Soper. Rating 90 C. F., capacity 300.000 hardwood, 425,000 pine; boiler pressure 150 lbs.; good economical boat; hull in first class condition throughout. Also tow barge Halstead, capacity 750,000 lumber; recently extensively rebuilt. Both boats now at Green Bay. Apply Greiling Bros. Co., Green Bay, Wis.

FOR SALE CHEAP—STR. F. R. BUELL. Length, 194 ft.; beam, 35 ft. 5 in.; depth, 13 ft. 9 in. Carries lumber cargo 900,000 ft. Coal, 1,250 tons. Inquire A. Weston & Son, N. Tonawanda, N. Y.

FOR SALE CHEAP—BGE. A. STEWART. Length, 172 ft.; beam, 32 ft. 4 in.; depth, 12 ft. 1 in. Carries lumber cargo 750,000 ft. Coal, 1,000 tons. Boats have kept up in good condition. Inquire A. Weston & Son, N. Tonawanda, N. Y.

FOR SALE:—TUG BRUCE 68 FT. KEEL, 16 ft. beam, 10 ft. deep; engine 17½ x 18 and boiler allowed 125 lbs. of steam. Edward Lutz, Michigan City, Ind.

FOR SALE:—DISMANTLED STEAMER "City of Straits", 230 ft. long, 36 ft. beam, 14 ft. deep. Composite construction. Sound and seaworthy. Suitable for carrying sand and gravel, coal, lumber or pulp wood. Edward Gray, 617 Emerson Ave., Detroit, Mich.

FOR SALE, FISH TUG ROCKET, STEEL screw steamer of 39 tons, built 1901; length 62.4 ft., breadth 15 ft., depth 7 ft.; engine 12 by 14. Boiler 8½ ft. by 60 in. Also 26 boxes (2 gangs) small mesh nets, 36 boxes (3 gangs) large mesh nets, corks, leads, lines, buoys, fish boxes, etc. The Boat and Rig will be sold separately. Inquire

Caroline Tallman,
Admrx. of Wm. Tallman, Deceased.
Erie, Pa.

FOR SALE: — PASSENGER STEAMER Thistle, $1,500 will take the above steamer if taken at once; 88 ft. overall, 14 1/10 ft. wide, depth 6 5/10 ft. Inquire Hart Transportation Co., Sturgeon Bay, Wis.

FOR SALE: — PASSENGER STEAMER Plowboy, length 78 ft., beam 22 ft., depth of hold 6 ft., engine, steeple compound 10 x 16 x 18, boiler, iron, steam allowed 100 lbs. Good 10 mile boat very easy on fuel. Fully equipped, electric lights, search light, etc. Has excursion permit for 271 passengers. This steamer has been well kept up and is in good condition. Can be bought at Duluth, Minnesota for $5,500 cash. Clow-Lloyd Co., Duluth, Minn.

FOR SALE:—WOODEN STEAMER: 300 ft. long; 3,000 tons capacity; modern hatches; triple expansion engine, Scotch boilers; (running machinery in excellent shape); 11-12 miles loaded. Inquire W. M. Williams, 1504 Rockefeller building, Cleveland, O.

MARINE MACHINERY FOR SALE.

Detroit Dry Dock Triple Expansion Engine, cylinders 20-33-54 by 42-in. stroke, complete propellor shaft, wheel and bearings.

Steeple Compound cylinders 18-in. and 36-in. by 26-in. stroke.

High pressure engine 14-in. by 14-in.

Scotch marine boiler 12½ by 11½, 165 lbs steam.

Leathem & Smith Towing & Wrecking Co.,
Sturgeon Bay, Wis.

FOR SALE:—TWO SCOTCH MARINE Boilers, 13 ft. 6 in. diameter, 12 ft. long; allowed 130 lb. steam, good condition; cheap for cash. Inquire Pringle Barge Line Co., 327 Rockefeller Bldg., Cleveland, O.

FOR SALE:—ALL STEEL TUG, 75 by 20 feet; 12-foot boiler, hull new 1910; built extra heavy for running in ice. At present being used in carrying 125 passengers. Can be seen at Buffalo. Wickwire Steel Co., Buffalo, N. Y.

Wanted

WANTED:—STEEL STEAMER 220 FT. to full canal dimensions, for a cash customer.

WANTED:—Steel steamer four to five thousand tons capacity with beam that will enable her to pass the canals, when cut in two, for cash customer.

WANTED:—Schooner, capacity 500 to 700 M. ft. lumber, three sticker full sail, preferred.

FOR SALE:—To quick cash buyer good capacity lumber steamer.

FOR EXCHAGE:—Good Michigan real estate for steam, tow or sailing vessels. Some cash; state just what you want to buy. John W. Averill, 1434 W. 6 St., Cleveland, O.

WANTED:—AM IN THE MARKET FOR the purchase of inland or sea-going barges; also tug boats; state dimensions, draught, age, condition of boats and price in first letter. Address Box 122, THE MARINE REVIEW, Cleveland, O.

WANTED: — MARINE FUEL OIL ENgine about 150 H. P. Address Box 308, Houghton, Mich.

WANTED: — SMALL STEEL STEAMER about 110 ft. long, 20 ft. beam, must have good free board. Write giving full particulars. M. C. Furstenau, 308 Walnut St., Philadelphia, Pa.

"Where-To-Buy"

A classified-by-products list of advertisers for the convenience of readers. If you don't find what you want, write us and we will tell you where to get it. ¶ Index to advertisements will give you page number of any advertiser and by referring to advertisement you can get full particulars about products.

AGENTS.—(Vessel and Freight.)
Boland & Cornelius
Hutchinson & Co.
Richardson, W. C.
Sullivan, D., & Co.
Vance & Joys Co.

AIR RECEIVERS.—(Welded Steel.)
Continental Iron Works, The

ANCHORS.
American Engineering Co.

ARCHITECTS.—(Naval.)
Babcock & Penton
Curr, Robert
Donnelly, Wm. T.
Farley, Edward P., Co.
Furstenau, M. C.
Reid, John, & Co.

ASBESTOS PRODUCTS.
Johns-Manville, H. W., Co.

ATTORNEYS AND PROCTORS IN ADMIRALTY.
Gilchrist, Albert J.
Goulder, White and Garry
Holding, Masten, Duncan & Leckie
Hoyt, Dustin, Kelley, McKeehan & Andrews
Kremer, C. E.
Lillie, Lillie & Lillie.
Spencer & Spencer
Warren, Cady & Ladd

AVERAGING COUNTERS.
Cummings Ship Instrument Wks.

BARS.—(Iron and Steel—Hollow Staybolt.)
Falls Hollow Staybolt Co.

BEACONS.
Safety Car Heating & Lighting Co.

BEDSTEADS.—(Brass and Steel.)
Southern Bedding Co.

BELLS.—(Engine Room, Telegraph, Call, Etc.)
Cory, Chas., & Sons

BERTHS & BUNKS.—(Ship.)
Southern Bedding Co.

BILGE PUMPS.
Blackmer Rotary Pump, Power & Mfg. Co.

BINNACLES.
Ritchie, E. S., & Sons

BLOCKS.—(Tackle.)
Boston & Lockport Block Co.
Welin Marine Equipment Co.

BLOWERS.
American Blower Co.

BLOWERS.—(Flue.)
American Ship Building Co.

BOATS.—(Builders of.)
Drein, Thomas, & Sons
Kahnweiler's Sons, David
Vulcan Iron Works.

BOILER CLEANER.
Johns-Manville, H. W., Co.

BOILER GRAPHITE.
Dixon, Joseph Crucible Co.

BOILER NOZZLES.—(Welded Steel.)
Continental Iron Works, The

BOILER STEAM AND WATER DRUMS.—(Welded.)
Continental Iron Works, The

BOILERS.
Collingwood Ship Building Co.
Lake Erie Boiler Works.

BOILERS.—(Marine.)
Almy Water Tube Boiler Co.
American Ship Building Co.
Babcock & Wilcox Co.
Bath Iron Works
Chicago Ship Building Co.
Commercial Boiler Works, The
Delaney, P., & Co.
Detroit Ship Building Co.
Fletcher, W. A., & Co.
Great Lakes Engrg. Works
Johnston Bros.
Kingsford Fdy. & Mach. Works
Lake Erie Boiler Works
Manitowoc Ship Building & Dry Dock Co.
Milwaukee Dry Dock Co.
Moore & Scott Iron Works.
Seattle Const. & Dry Dock Co.
Superior Ship Building Co.
Toledo Ship Building Co.
Vulcan Iron Works.
Ward, Chas., Engineering Co.

BOILER REPAIRS.
Commercial Boiler Works, The
Michigan Salt Works.

BOOKS.
Penton's Book News.

BRASS GOODS.
Penberthy Injector Co.

BRASS SPECIALTIES.
Detroit Ship Building Co.

BROKERS.—(Vessel.)
Boland & Cornelius
Richardson, W. E., & Co.
Sullivan & Co., D.

BRUSHES, GRAPHITE.—(For Motor or Dynamo.)
Dixon, Joseph, Crucible Co.

BUOYS.
Kahnweiler's Sons, David

BUOYS.—(Gas & Spar.)
Safety Car Heat'g & Lighting Co.

BUSHINGS.—(Adjustable.)
Armstrong Mfg. Co.

CABLES.
Durable Wire Rope Co.
Waterbury Co.

CAPSTANS.
American Engineering Co.
Chase Machine Co.
Dake Engine Co.
Hyde Windlass Co.

CASTINGS.
Collingwood Ship Building Co.
Sheriffs Mfg. Co.

CASTINGS.—(Brass and Bronze.)
Dake Engine Co.
Great Lakes Engineering Works
Trout Co., H. G.

CATALOGS WANTED.
LeMois, Scientifique

CHOCKS.
American Engineering Co.
Welin Marine Equipment Co.

CIRCULATORS.—(Boiler.)
Eckliff Automatic Boiler Circulator Co.
McNab Co.

COAL.—(Producers and Shippers.)
Hall, Geo., Coal Co.
Hanna, M. A., & Co.
Lorain Coal & Dock Co.
Pickands, Mather & Co.

COMPASSES.
Ritchie, E. S., & Sons

CONDENSERS.
American Engineering Co.
Great Lakes Engineering Works

CONDENSER SHELLS.—(Welded Steel.)
Continental Iron Works, The

CONTRACTORS.—(Dredging.)
Breymann, G. H., & Bros.

CONTRACTORS.—(Public Work.)
Breymann, G. H., & Bros.

CONVEYORS.
General Electric Co.

CORDAGE.
Waterbury Co.

CORK.
Brauer, Justus, & Sons, Inc.
Cork Jackets and Cork Rings
Kahnweiler's Sons, David

COUCHES & COTS.—(Folding.)
Southern Bedding Co.

COUCH HAMMOCKS.
Southern Bedding Co.

COUNTERS—(Averaging.)
Cummings Ship Instrument Wks.

CRANES.
General Electric Co.

CRANES.—(Dock.)
American Engineering Co.

CRANES.—(Electric Boat.)
American Engineering Co.

CRANES.—(Locomotive.)
American Engineering Co.

CRAYONS.—(Lumber.)
Dixon, Joseph, Crucible Co.

CUTTERS.—(Pipe.)
Armstrong Mfg. Co.

CYLINDERS.—(Welded.)
Continental Iron Works, The

DAVITS.
Welin Marine Equipment Co.

DAVITS & DAVIT FALLS.
Welin Marine Equipment Co.

DECK FLOORING.—(Composition.)
Byerley and Sons

DERRICKS.
Dake Engine Co.
Superior Iron Works

DESIGNERS.—(Ship.)
Babcock & Penton
Curr, Robert
Furstenau, M. C.

DIES.
Armstrong Mfg. Co.

DIVING APPARATUS.
Morse, A. J., & Son.
Schrader's Sons, A., Inc.

DOCKS—(Designers of.)
Donnelly, Wm. T.

DOCK BUILDING.
Breymann, G. H., & Bros.

DRAFT.—(Artificial and Mechanical for Boilers.)
American Blower Co.
American Ship Building Co.
Detroit Ship Building Co.
Great Lakes Engineering Works

DRAFT GAGE.
Blackmer Rotary Pump, Power & Mfg. Co.
McNab Co.

DREDGING OUTFITS.—(Constructors of.)
Buffalo Dry Dock Co.

DREDGING MACHINERY.
American Engineering Co.
Chase Machine Co.
Great Lakes Eng. Works.
Superior Ship Building Co.
Vulcan Iron Works.

DROPS—(Wharf.)
American Engineering Co.

DRY DOCKS.
American Ship Building Co.
Baltimore Dry Dock & Ship Bldg. Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Detroit Ship Building Co.
Great Lakes Engineering Works
Kennedy Valve Mfg. Co.
Manitowoc Ship Bldg. & Dry Dock Co.
Milwaukee Dry Dock Co.
Seattle Construction and Dry Dock Co.
Superior Ship Building Co.
Tietjin & Lang Dry Dock Co.
Toledo Ship Building Co.
Vulcan Iron Works.

DYNAMOS.
General Electric Co.

EJECTORS.
Penberthy Injector Co.

EJECTORS.—(Ash.)
Great Lakes Engineering Works

ENAMELS.
Patterson-Sargeant Co.

ENGINEERS.—(Marine, Mechanical and Consulting.)
Babcock & Penton
Donnelly, Wm. T.
Farley, Edward P., Co.
Furstenau, M. C.
Griscom-Russel, The, Co.
Moore & Scott Iron Works.
Seattle Const. & Dry Dock Co.

ENGINEER'S SPECIALTIES
Penberthy Injector Co.
Ross Valve Mfg. Co.

See Index to Advertisements for pages containing advertisements of companies listed above

ENGINES.
American Engineering Co.
American Ship Building Co.
Chase Machine Co.
Engberg's Electric & Mechanical Works.
Seattle Construction & Dry Dock Co.
Superior Iron Works

ENGINES.—(Hoisting.)
American Blower Co.
American Engineering Co.
Chase Machine Co.
Hyde Windlass Co.
Superior Iron Works

ENGINES.—(Marine.)
American Blower Co.
American Ship Building Co.
Bath Iron Works
Chase Machine Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Detroit Ship Building Co.
Fletcher, W. A., Co.
Fore River Ship Building Corp.
Great Lakes Engineering Works
Johnston Bros.
Lidgerwood Mfg. Co.
Manitowoc Ship Bldg. & Dry Dock Co.
Milwaukee Dry Dock Co.
Sheriffs Mfg. Co.
Superior Ship Building Co.
Toledo Ship Building Co.
Trout, H. G.

ENGINES.—(Mooring.)
American Engineering Co.
Chase Machine Co.

ENGINES.—(Steering.)
American Engineering Co.
Hyde Windlass Co.

ENGINE STOPPING DEVICES
Mulholland Hatch Fastener Co.

FANS.
American Blower Co.

FASTENERS.—(Hatch.)
Mulholland Hatch-Fastener Co.

FILTERS.—(Feed Water.)
Griscom-Russel, The, Co.
Ross Valve Mfg. Co.

FIRE ESCAPES
McArthur Portable Fire Escape Co.

FIRE ALARM SYSTEMS.
Cory, Chas., & Sons

FIRE DEPARTMENT SUPPLIES.
Morse, A. J., & Son

FIXTURES.
General Electric Co.

FLOORS.
Johns-Manville, H. W., Co.

FLOORING (Composition.)
Byerley & Sons

FLOORING (Warehouse.)
Byerley & Sons
Johns-Manville, H. W., Co.

FORGINGS
Collingwood Ship Building Co.

FORGINGS.—(Steel.)
Fore River Ship Building Corp.

FOUNDERS.
Chase Machine Co.
Kingsford Foundry & Machine Works
Seattle Const. & Dry Dock Co.

FUELING COMPANIES AND COAL DEALERS.
Hall, Geo., Coal Co.
Hanna, M. A., & Co.
Lorain Coal & Dock Co.
Pickands, Mather & Co.

FURNACES.—(Boilers.)
Continental Iron Works, The

FURNACE FRONTS AND DOORS.—(Land and Marine.)
Continental Iron Works, The

GAGES.—(Steam.)
Ashton Valve Co.

GAGES.—(Water.)
Penberthy Injector Co.

GASKETS.
Johns-Manville, H. W., Co.

GENERATORS.
Engberg's Electric & Mechanical Works.
General Electric Co.
International Oxygen Co.

GRAPHITE.
Dixon, Joseph, Crucible Co.
Johns-Manville, H. W., Co.

GRAPHITE.—(Boiler Lubricating, Greases.)
Dixon, Joseph, Crucible Co.

GRATE BARS.
Sheriffs Mfg. Co.
Trout Co., H. G.

GREASES.
Dixon, Joseph, Crucible Co.

GYPSEYS.—(Steam.)
American Engineering Co.

HAMMERS.—(Steam.)
Chase Machine Co.

HATCH FASTENERS.
Mulholland Hatch Fastener Co.

HEATERS AND PURIFIERS.—(Feed Water.)
Ross Valve Mfg. Co.

HOISTS.—(Air.)
American Ship Building Co.
Great Lakes Engineering Works

HOISTS.—(Anchor.)
Superior Iron Works

HOISTS.—(Cargo, Etc.)
American Engineering Co.
Boston & Lockport Block Co.
Chase Machine Co.
Dake Engine Co.
General Electric Co.

HOISTS.—(Chain.)
Dake Engine Co.

HOISTS.—(Electric.)
American Engineering Co.
General Electric Co.

HOISTS.—(Pneumatic.)
Dake Engine Co.

HOSE.
Schrader's Son, A., Inc.

HOTELS.
Hotel Tuller

HYDROGEN GENERATORS.
International Oxygen Co.

ICE MACHINES.
Clothel Company, The
Roelker, H. B.

INDICATORS.
Cummings Ship Instrument Works
Electro Dynamic Co.
McNab Co.

INDICATORS.—(Direction.)
Cummings Ship Instrument Wks.
Electro Dynamic Co.
McNab Co.

INDICATORS.—(Recording.)
McNab Co.

INDICATORS.—(Speed.)
Cummings Ship Instrument Wks.
Johns-Manville, H. W., Co.
McNab Co.

INJECTORS.
Penberthy Injector Co.

INSULATION.—(Asbestos and Electrical.)
Johns-Manville, H. W., Co.

INSURANCE.—(Marine.)
Boland & Cornelius
Hutchinson & Co.
Richardson, W. C., & Co.
Vance & Joys Co.

IRON ORE.
Hanna, M. A., & Co.
Pickands, Mather & Co.

LADDERS.—(Portable.)
McArthur Portable Fire Escape Co.

LAMPS.—(Mazda and Arc.)
General Electric Co.

LANTERNS.—(Buoy.)
Safety Car Heating & Lighting Co.

LAUNCHES.
Drein, Thomas & Sons

LIFE BOATS
Detroit Ship Bldg. Co.
Drein, Thomas & Son
Kahnweiler's Son, David
Lane, C. M., Life Boat Co.
Welin Marine Equipment Co.

LIFE RAFTS.
Detroit Ship Building Co.
Drein, Thos., & Son
Lane, C. M., Life Boat Co.

LIFE BOAT RELEASING DEVICE.
Lane, C. M., Life Boat Co.
Mulholland Hatch Fastener Co.

LIFE BOAT SYSTEM.
Lane, C. M., Life Boat Co.
Welin Marine Equipment Co.

LIFE PRESERVERS.
Bauer, Justus, & Son, Inc.
Kahnweiler's Sons, David
Lane, C. M., Life Boat Co.

LIFE SAVING EQUIPMENT.
Bauer, Justus, & Son, Inc.
Drein, Thos., & Son
Kahnweiler's Sons, David
Lane, C. M., Life Boat Co.
Welin Marine Equipment Co.

LIGHTS.
Safety Car Heating & Lighting Co.

LIGHTS.—(Electric.)
Cory, Chas., & Son
General Electric Co.

LOGS.—(Patent.)
Cummings Ship Instrument Works

LOGS.—(Ship.)
Walker, Thomas, & Sons

LUBRICANTS.
Dixon, Joseph, Crucible Co.

LUBRICATING GRAPHITE.
Dixon, Joseph, Crucible Co.

LUBRICATORS.
Penberthy Injector Co.

MACHINERY.
Kingsford Foundry & Machine Works

MACHINERY.—(Marine.)
American Ship Building Co.
Chase Machine Co.
Chicago Ship Building Co.
Collingwood Ship Bldg. Co.
Dake Engine Co.
Detroit Ship Building Co.
Fletcher Co., W. & A.
Fore River Ship Building Corp.
Great Lakes Engineering Works
Johnston Bros.
Manitowoc Ship Bldg. & Dry Dock Co.
Sheriffs Mfg. Co.
Superior Iron Works
Superior Ship Building Co.
Toledo Ship Building Co.

MACHINISTS.
Chase Machine Co.
Marine Equipment
Seattle Construction & Dry Dock Co.
Superior Iron Works
Vulcan Iron Works.

MARLINE.
Waterbury Co.

MARLINE COVERED WIRE ROPE.
Waterbury Co.

MECHANICAL WORKS.
Engberg's Elec. & Mech. Wks.

METERS.—(Torsion.)
Cummings Ship Instrument Works

MOORING LINES
Durable Wire Rope Co.

MOTORS.—(Electric.)
Electro Dynamic Co.
General Electric Co.

MOTORS.—(Winch.)
General Electric Co.

MUSIC WIRE.
Waterbury Co.

NAUTICAL INSTRUMENTS.
Ritchie, E. S., & Sons.

NOZZLES.
Morse, A. J., & Sons

OAKUM.
Stratford Oakum Co., Geo.

OILS AND LUBRICANTS.
Dixon, Joseph, Crucible Co.

OIL.—(Linseed.)
Patterson Sargeant Co.

OXYGEN AND HYDROGEN CYLINDERS AND CYLINDER STUD VALVES.
International Oxygen Co.

OXYGEN TESTING APPARATUS, WELDING AND CUTTING APPARATUS.
International Oxygen Co.

OXYGEN GENERATORS
International Oxygen Co.

PACKING.
Home Rubber Co.
Johns-Manville, H. W., Co.

PACKING.—(Metallic, Sheet Rubber, Spiral and Coil Steam.)
Johns-Manville, H. W., Co.

PAINT.—(Copper and Iron.)
Patterson-Sargeant Co.

PAINT.—(Graphite.)
Dixon, Joseph, Crucible Co.
Patterson-Sargeant Co.

PAINT.—(Hull.)
Patterson-Sargeant Co.

PAINT.—(Marine.)
Patterson-Sargeant Co.

PATENTS.
Siggers & Siggers

PIG IRON
Hanna, M. A., & Co.
Pickands, Mather & Co.

PIPE.—(Welded Steel.)
Continental Iron Works, The

PIPE COVERING.
Johns-Manville, H. W., Co.

PIPE BENDING MACHINES.
Cox Engrg. & Tube Bending Machine Works.

PLUMBAGO.
Dixon, Joseph, Crucible Co.

POWER PLANTS.
General Electric Co.

PROJECTORS.—(Electric.)
General Electric Co.

PROPELLER BLADES.
Sheriffs Mfg. Co.

PROPELLER WHEELS.
American Ship Building Co.
Case, A. Wells, & Son
Detroit Ship Building Co.
Fore River Ships Building Corp.
Great Lakes Eng. Works
Hyde Windlass Co.
Milwaukee Dry Dock Co.
Roelker, H. B.
Sheriffs Mfg. Co.
Superior Ship Building Co.
Toledo Ship Building Co.
Trout Co., H. G.
Vulcan Iron Works.

PROVISIONS.—(Ship.)
Duluth Marine Supply Co.
Erdman, Joseph
Gunn, P. J.
Jung, J. & W., Co.
Koehler Bros.
Schroeder Bros. Co.

PUMPS.
Boston Lockport & Block Co.

PUMPS AND APPLIANCES.—(Air.)
Great Lakes Engineering Works
Kingsford Fdy. & Machine Co.

PUMPS.—(Bilge.)
Blackmer Rotary Pump, Power & Mfg. Co.

PUMPS.—(Miscellaneous Use.)
Blackmer Rotary Pump, Power & Mfg. Co.
Great Lakes Engineering Works.
Kingsford Fdy. & Machine Co.
Roelker, H. B.

See Index to Advertisements for pages containing advertisements of companies listed above

REFRIGERATING MACHINERY.
Clothel, The, Co.
Great Lakes Eng. Works
Johns-Manville, H. W., Co.
Roelker, H. B.

REGULATORS.—(Pressure.)
Ross Valve Mfg. Co.

RELEASING DEVICE.—(Life Boat.)
Mulholland Hatch Fastener Co.

REPAIRS.—(Boiler.)
Commercial Boiler Works, The
Michigan Salt Works

REPAIRS.—(Marine.)
American Ship Building Co.
Baltimore Dry Dock & Ship Bldg. Co.
Buffalo Dry Dock Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Delaney, P., & Co.
Detroit Ship Building Co.
Fore River Ship Building Corp.
Goldschmidt Thermit Co.
Great Lakes Engineering Works
Johnston Bros.
Kennedy Valve Mfg. Co.
Manitowoc Ship Bldg. & Dry Dock Co.
Michigan Salt Works.
Milwaukee Dry Dock Co.
St. Lawrence Marine Ry. Co.
Seattle Construction & Dry Dock Co.
Sheriffs Mfg. Co.
Superior Ship Building Co.
Tietjen & Lang Dry Dock Co.
Toledo Ship Building Co.

REVOLUTION COUNTERS
Cummings Ship Instrument Works

RIVETS.—(Steel for Ships and Boilers.)
Great Lakes Engineering Works.

ROPE.
Durable Wire Rope Co.

ROPE.—(Wire, Manilla & Fibre-clad.)
Waterbury Co.

ROPE AND FITTINGS.
Durable Wire Rope Co.

ROPE DRESSING.
Dixon, Joseph, Crucible Co.

ROPE DRIVES.
Waterbury Co.

SEARCHLIGHTS.
Engberg's Electric & Mechanical Works.
General Electric Co.

SHEAVES.
Boston & Lockport Block Co.

SHEAVE LUBRICATING DEVICE.
Mulholland Hatch Fastener Co.

SHEET IRON WORK
Commercial Boiler Works, The

SHIP BUILDING SYSTEM.
Isherwood, J. W.

SHIPS.—(Builders of.)
American Ship Building Co.
Baltimore Dry Dock & Ship Bldg. Co.
Bath Iron Works
Buffalo Dry Dock Co.
Chicago Ship Building Co.
Collingwood Ship Building Co.
Detroit Ship Building Co.
Fletcher, W. & A., Co.
Fore River Ship Building Corp.
Great Lakes Engineering Works
Johnston Bros.
Kennedy Valve Mfg. Co.
Manitowoc Ship Building & Dry Dock Co.
Milwaukee Dry Dock Co.
Moore & Scott Iron Works.
Seattle Const. & Dry Dock Co.
Superior Ship Building Co.
Tietjen & Lang Dry Dock Co.
Toledo Ship Building Co.

SMOKE STACKS.
Lake Erie Boiler Works

SPECIALTIES.—(Steam.)
Penberthy Injector Co.
Ross Valve Mfg. Co.

SPRINGS.—(Bed & Bunk.)
Southern Bedding Co.

STAYBOLTS.—(Boiler, Iron or Steel, Hollow or Solid.)
Falls Hollow Staybolt Co.

STEAMSHIP LINES.—(Passenger and Freight.)
American Line
International Mercantile Marine Co.

STEERING GEARS.
American Engineering Co.
American Ship Building Co.
Chase Machine Co.
Dake Engine Co.
Detroit Ship Building Co.
Hyde Windlass Co.
Sheriffs Mfg. Co.

STOCKS.
Armstrong Mfg. Co.

STOKERS.
American Engineering Co.
Babcock & Wilcox Co.

STOPPERS.—(Chain.)
American Engineering Co.

SUBMARINE ARMOR.
Morse, A. J., & Son
Schrader's Son, Inc., A.

SUPERHEATERS.—(Marine.)
Babcock & Wilcox Co.
Locomotive Superheater Co.

SUPPLY HOUSES.
Duluth Marine Supply Co.
Erdman, Joseph.
Gunn, P. J.
Jung, J. & W., Co.
Koehler Bros.
Schroeder Bros. Co.

SURVEYORS.—(Marine.)
Babcock & Penton
Curr, Robert
Furstenau, M. C.

SWITCHBOARDS.
General Electric Co.

TANKS.
Bath Iron Works

TANKS.—(Riveted.)
Lake Erie Boiler Works

TANKS.—(Steel.)
Fore River Ship Building Corp.

TANKS.—(Welded Steel.)
Continental Iron Works, The

TELEGRAPH.—(Mechanical.)
Cory, Chas., & Sons

TESTS OF MATERIALS.
Babcock & Penton
Curr, Robert
Furstenau, M. C.

THERMIT.
Goldschmidt Thermit Co.

TORSION METERS.
Cummings Ship Instrument Wks.

TOWING LINES.—(Manila, Wire.)
Waterbury Co.

TOWING MACHINES.
American Engineering Co.
Chase Machinery Co.

TRAMWAYS.—(Wire Rope.)
Waterbury Co.

TRANSMISSION.—(Rope.)
Waterbury Co.

TUGS.
Bath Iron Works

TURBINES.
Bath Iron Works
Fletcher, W. A., & Co.
Fore River Ship Building Corp.

VALVES.
Ashton Valve Co.
Penberthy Injector Co.
Ross Valve Mfg. Co.

VALVES.—(For Water and Gas.)
Ashton Valve Co.

VESSEL AGENTS.
Vance & Joys Co.

VESSEL BROKERS.
Farley, Edward P., Co.
Richardson, W. C., & Co.

WELDING.—(Electric.)
Michigan Salt Works.
Vulcan Iron Works.

WELDING.—(Flue.)
Case, A. Wells, & Son

WELDING PROCESSES.
Goldschmidt Thermit Co.

WINCHES.
American Engineering Co.
Chase Machine Co.
Hyde Windlass Co.
Lidgerwood Mfg. Co.

WINDLASSES.
American Engineering Co.
American Ship Building Co.
Dake Engine Co.
Hyde Windlass Co.

WIRE.
Waterbury Co.

WIRE AND WIRING DEVICES.
General Electric Co.

WIRE ROPE.
Durable Wire Rope Co.
Waterbury Co.

WIRE ROPE DRESSING.
Dixon, Joseph, Crucible Co.

YACHTS.—(Builders.)
Bath Iron Works

YACHT PLUMBAGO.
Dixon, Jos., Crucible Co.

YARN.—(Lath, Fodder.)
Waterbury Co.

YAWLS.
Drein, Thos., & Son
Manitowoc Ship Bldg. & Dry Dock Co.

SANITARY SUPPLY HOUSES

BUFFALO, N. Y.

P. J. GUNN, 120 Michigan Ave., Buffalo, N. Y. Groceries and marine supplies. Auto truck and launch delivery.

DETROIT, MICH.

JOSEPH ERDMAN, 932-936 Congress St. East, Detroit, Mich. Fine groceries and meats. Imported wines and liquors. Paints, oils, leads, etc. Prompt deliveries. Phones: East 110, East 3028.

DULUTH, MINN.

THE DULUTH MARINE SUPPLY CO. Largest on the Great Lakes. Meats, groceries, ship chandlery, cabin supplies, oils, ice and milk. Delivered directly and promptly by our three tugs aboard ship. Foot of Fifth Ave. West. 780 both phones.

TWO RIVERS, WIS.

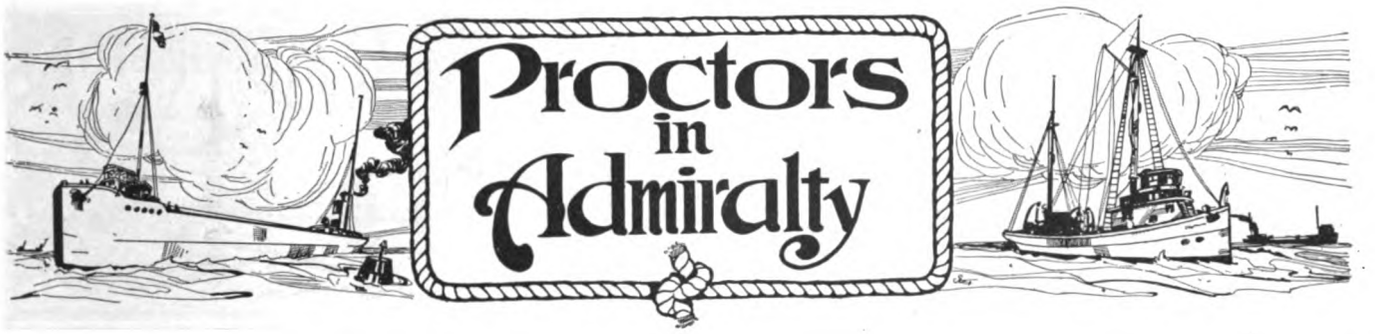
SCHROEDER BROS. CO., Two Rivers, Wis. Dealers in general mdse., staple and fancy groceries, fruits and vegetables. Marine trade solicited and promptly served.

SANDUSKY, O.

KOEHLER BROS., 209 Adams St., Sandusky, O. City and Marine Meat Market. Meats and Sausages of all kinds. Vessel supplies a specialty. Launch delivery. Both Phones 344.

SHEBOYGAN, WIS.

J. & W. JUNG CO., Sheboygan, Wis. —A Department Store with a Clean Grocery Stock and prompt service. Ask for Jung's Store.



ALBERT J. GILCHRIST
PROCTOR IN ADMIRALTY
Rockefeller Building
CLEVELAND, O.

C. E. KREMER,
COUNSELOR AT LAW AND
PROCTOR IN ADMIRALTY
Suite 1012-1016 Insurance Exchange Building
CHICAGO, ILL.

GOULDER, WHITE AND GARRY
LAW OFFICES
Rockefeller Building CLEVELAND, O.

Walter I. Lillie Leo C. Lillie Hugh E. Lillie
LILLIE, LILLIE & LILLIE
LAWYERS
Proctors in Admiralty, General Practitioners and Commercial Collections
Business Address, GRAND HAVEN, MICHIGAN

S. H. HOLDING, F. S. MASTEN, T. H. DUNCAN and F. L. LECKIE
HOLDING, MASTEN, DUNCAN & LECKIE
ATTORNEYS AT LAW AND
PROCTORS IN ADMIRALTY
840-848 Rockefeller Building CLEVELAND, O.

Spencer & Spencer
ATTORNEYS AT LAW
PROCTORS IN ADMIRALTY
Alworth Building, Duluth, Minn.

HOYT, DUSTIN, KELLEY, McKEEHAN & ANDREWS,
LAWYERS AND PROCTORS IN ADMIRALTY
Offices, 702 Western Reserve Bldg.,
CLEVELAND, O.

WARREN, CADY, LADD & HILL
ATTORNEYS AT LAW AND PROCTORS
IN ADMIRALTY
Charles B. Warren
William B. Cady
Sanford W. Ladd
Joseph G. Hamblen, Jr.
Sherwin A. Hill
Claudius B. Grant, Counsel
Union Trust Building, Detroit

The Dignified Means

Whereby every professional man interested in the marine field may increase his clientele is offered thru ***The Marine Review.***

Proctors in Admiralty, who keep their names constantly before our readers, have a distinct advantage over non-advertisers—there's a prestige gained thru ***The Marine Review*** that cannot be obtained in any other way.

Your professional card on this page would cost a very small amount and the investment would prove the best you ever made in publicity service.

Rates gladly quoted upon request.

THE MARINE REVIEW :: :: :: **Cleveland, Ohio**

110

John J. Boland — Adam E. Cornelius

BOLAND & CORNELIUS

VESSEL OWNERS AND BROKERS

Marine Insurance Agents

1204 Prudential Building,
BUFFALO, N. Y.

D. SULLIVAN — A. C. SULLIVAN

D. SULLIVAN & COMPANY

VESSEL AGENTS

Continental & Commercial Bank Building
208 South LaSalle Street
CHICAGO, ILL.

C. L. Hutchinson — W. H. McGean

HUTCHINSON & CO.

VESSEL AND INSURANCE AGENTS

Phones: { Office; Main 2453
Res. C. L. Hutchinson, Marlo 244
Res. W. H. McGean, Garfield 274

1011 Leader-News Bldg. — Cleveland

VANCE & JOYS CO.

VESSEL AND INSURANCE AGENTS

1004-1006 First National Bank Building

TELEPHONE MAIN 3907

MILWAUKEE, WIS.

W. C. Richardson — Clarence E. Richardson
John T. Kelly — Tracy H. Paine

W. C. RICHARDSON & CO.

VESSEL OWNERS AND BROKERS AND
MARINE INSURANCE AGENTS

816-818 Leader-News Bldg., Cleveland, O.
Office Tel., Main 338
Residence 'Phone { W. C. Richardson, Doan 404.
John T. Kelly, East 3610
Clarence E. Richardson, Eddy 492

REAL BARGAINS

in used equipment are constantly being offered the readers of *The Marine Review* thru its classified columns and it will pay you to

GET THE HABIT

of referring to that section each month.

TAKE A LOOK—NOW! You may find something of interest to you

111

Vessel and Insurance Agents—Everywhere

Need ***The Marine Review*** back of them today more than ever before because the prestige of the paper is constantly increasing.

The very men in the marine field—the actual boat owners and operators—whose business you wish to obtain can be effectively reached thru this paper and at a trifling cost.

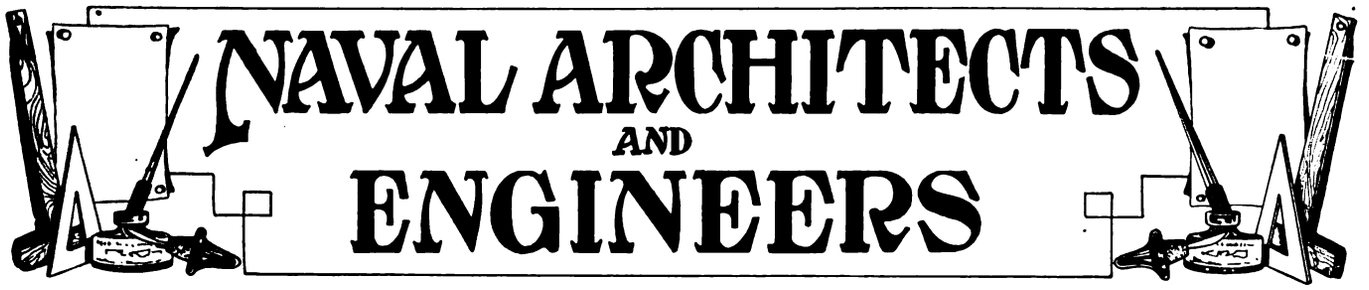
The price of two good cigars a day applied to ***Marine Review*** publicity will enable you to substantially increase your business, and the possibilities should prompt you to make early reservation.

Tell us you're interested and we'll submit rates.

THE MARINE REVIEW

Cleveland, Ohio

230



THE MARINE REVIEW

VOL. 46 CLEVELAND MAY, 1916 NEW YORK No. 5

Alphabetical List of Advertisers, page 72 Contents, page 5 "Where-to-Buy," page 64 Classified Advertisements page 70